



A Publication of  
Grove Enterprises, Inc.

# Monitoring Times®

- A Scanner Collecting Primer
- How Safe and Effective is Your Antenna Ground?
- Shortwave Broadcast Schedules, Reviews, Projects, and Hints Covering the Radio Spectrum

## Leapfrogging the Atlantic

S O U T H  
A M E R I C A

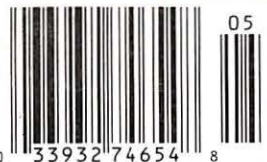
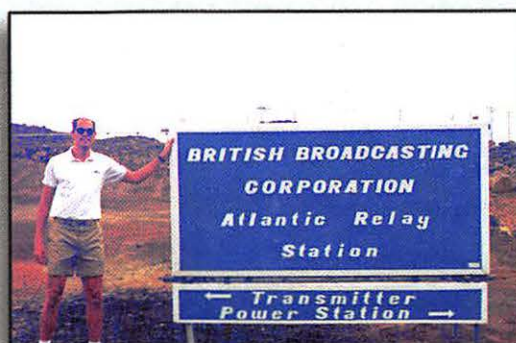
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61.2950 MHz	Local Railway	12:57:00
54.9200 MHz	Sheriff's Office	12:56:02
64.7500 MHz	Marina	12:55:32
61.0500 MHz	University	12:50:35
60.8000 MHz	Airport	12:50:14
64.9750 MHz	Local Government	12:49:58
55.3700 MHz	Fire Rescue	12:49:57
55.3700 MHz	Hwy Patrol	12:49:55
70.8625 MHz	Local Police	12:49:53
57.5875 MHz	Hardware Store	12:49:52
57.5375 MHz	Hardware Store	12:49:48

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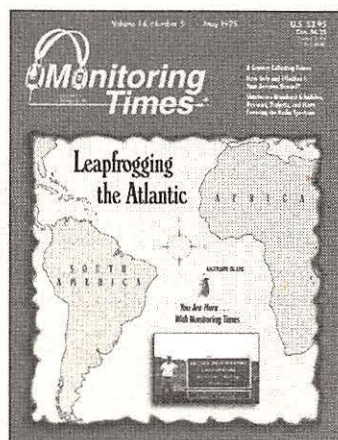
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## Cover Story

## Leapfrogging the Atlantic

by Stephen W. Worden,  
NN3M/ZD8NN

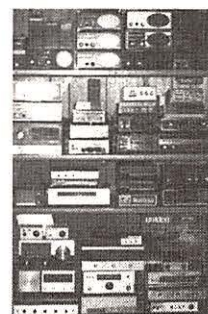
On an island of volcanic rock, isolated in the middle of the South Atlantic, it might be a surprise to find a smoothly functioning, high-tech system producing enough water and power to supply a small city. Ascension Island has been home to a BBC relay station since 1966, and all this energy doesn't power a city; it beams the BBC World Service into homes on two continents.

Despite the forbidding aspect of the terrain, the author (pictured on the cover at the site entrance) found a warm and enthusiastic welcome from the residents and the BBC staff. Join him as *MT* tags along on a tour of this very efficient operation. See page 9.

## A Scanner Collecting Primer ..... 14

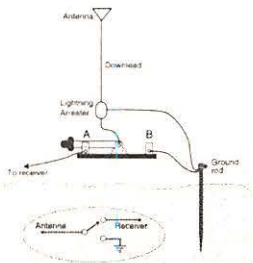
by Bob Parnass

The author freely admits it: he has a passion for collecting, restoring, and using scanner radios. Since these VHF/UHF receivers had their start in the 1950's, it is not only possible, but relatively inexpensive to build your own "museum" of these receivers. But first you need to know their history. This article not only provides the groundwork for starting your own collection, but it should also give you a new appreciation for today's sophisticated models.



## Antenna Grounds ..... 20

by Joseph Carr



How safe and effective is your antenna ground? If you have an outside antenna, this is not a trivial question—it could be a critical one. Or, if you're like the gentleman who grounded his receiver to a convenient copper pipe in his basement, turn to this article without delay! Learn from the expert.

## Independent SW Broadcasting in Canada ..... 24

by Adrian Peterson

In the second half of this overview of shortwave broadcasting in Canada, Peterson takes us through the western provinces, where mediumwave broadcasters often have had to resort to shortwave relays to get their signal into the mountains and the northern reaches of this far-flung and sparsely-populated territory.



## Try Searching ..... 28

by Ed Hesse

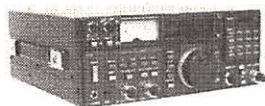
If you're looking for more enjoyment out of your scanning hobby, maybe you haven't been using your search button enough!

## Hooked on Scanning ..... 31

by Randy Locke

It was a small town where nothing ever happened; my scanner piped in just enough action from near-by Boston to keep me hooked. And then one day ...

## Reviews:



"What is the longest-running, current short-wave receiver, and what accounts for its longevity?" is the question asked by Magne this month. The answer is the ICOM IC-R71, a tabletop model which first appeared in 1984. Though the receiver is not without its flaws, few models can beat it for pulling a weak signal out of adjacent interference—a broadcast and utility DXer's dream (page 102).

The new Uniden BC860XLT is no high-performance machine, but if you're a relative beginner looking for a reasonably-priced upgrade unit, check out Parnass' review on page 100; this model has some good things going for it.

Long a tool of surveillance experts, spectrum displays are just beginning to become affordable for hobbyists. AOR's SDU5000, designed primarily as an accessory for the sophisticated AR3000 general coverage receiver, is reviewed this month by Lee Reynolds (page 98).

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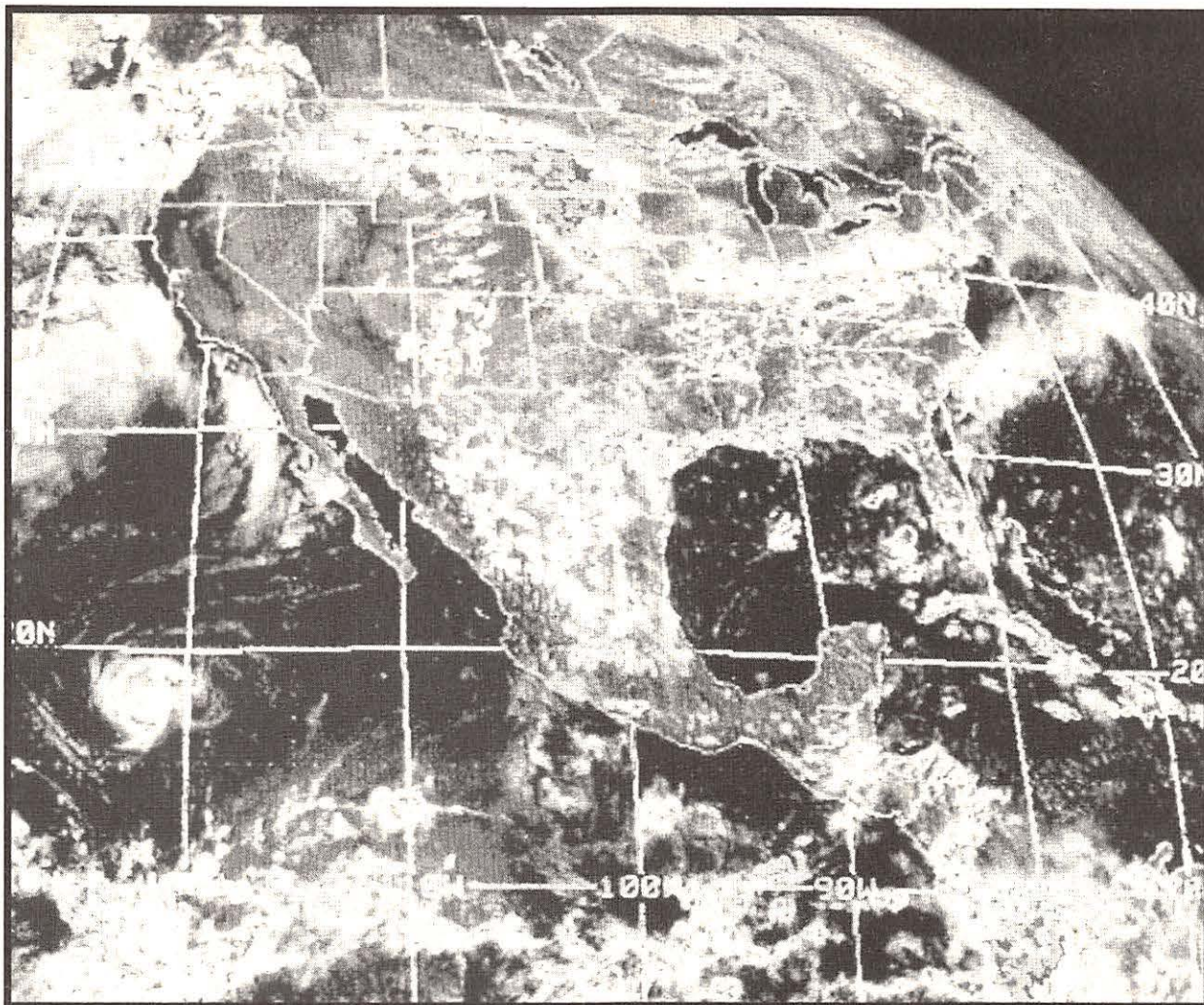


Image received and colorized using AEA FAX III

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AEA FAX III's color enhancement lets you colorize maps and WeFax images however you want. See cloud formations and weather patterns that just can't be seen in gray-scale. Export your colorized images to PCX or GIF files for use in other applications.

Choose schedules from the fax station database (included) and go do something else. AEA FAX III allows your computer to switch frequencies on your computer controllable receiver, receive transmissions, and save

them. When you come back you'll have images waiting for you. View the images you receive in the special slide show-mode.

AEA FAX III is easy to use right out of the box. Simply plug in the demodulator (shown here), install the software, and you're ready to receive highly detailed images. Tuning the signal is easy, AEA FAX III has an on-screen tuning indicator to help you keep the signal coming in clearly.

Don't be left out in the cold when it comes to high-tech weather reception, get AEA FAX III. Call AEA's Literature Request line at (800) 432-8873 for more information. See your favorite

amateur radio equipment dealer for best pricing.



Requires PC-compatible XT, AT, or better and a general coverage HF SSB receiver. VGA monitor required for gray-scale fax display and false-color.



*Connect with us*

# "Your presence is requested ..."

With a bow to our new sister publication, Satellite Times, and to our parent company, the annual MT convention has a new name which reflects

this now-expanded event: The Grove Communications Expo! You'll see program details gradually unfold, beginning with this issue. We're very excited about the speakers and exhibitors who have signed on so far. This year there will be even more ways for attendees to meet each other and participate in some hands-on experience. Look for the Expo ad in this issue, and put October 13-15 on your calendar today!



## Will the Oldest Station Sign In, Please?

■ "An article in the January 1995 MT listed Radio Argentina as [possibly] the world's first radio station," says David Everett of Madison. "I thought you might be interested in some details about a station at the University of Wisconsin."

"Station 9XM started broadcasting music and talk in 1917 here at the University of Wisconsin in Madison. Prior to this date, according to the plaque on the wall outside the station, 9XM broadcast "telegraphic signals." The station was permitted to remain on the air during World War I in 1918 to assist with naval operations in the Great Lakes. Regular broadcasts started in 1919. On January 13, 1922, 9XM changed its call sign to that which it presently uses—WHA.

"If 1919 is taken as the start of broadcasting by 9XM/WHA, it would appear that this station predates Radio Argentina and also KDKA in Pittsburgh (commonly thought of as the oldest station in the US). In fact, WHA used to include the slogan, "Oldest station in the nation" as part of its station ID a number of years ago. I'd be interested to see if any other readers can find an older radio station."

How about it; is there yet another station out there that claims the title of oldest broadcaster?

## Tourist Trap?

■ Andy Cadier of Folkestone, Kent, in the U.K., sent in an item that appears in this month's "Com-

munication" column, regarding an unlucky radio listener who got caught with his radio tuned to a pirate station. Andy adds this warning: "I would strongly suggest to anyone contemplating coming to Great Britain on holiday and bringing with them radio receiving equipment (your TV's won't work here!), they should write to the Radiocommunications Agency for details of HF and VHF radio listening and the law. The address is RadCom Agency, Waterloo Bridge House, Waterloo Road, London SE1 8UA, England."

## Calling the Shots

■ Given the events of the past few months, Brian Webb of Thousand Oaks, CA, was "dead on" when he predicted imminent political turmoil in Mexico. In his letter, written last August, Brian reported an interesting pre-election conversation on 5655.96 kHz between a lieutenant (#1) and (presumably) an enlisted man (#2).



#1: "If you go to vote, go early and behave well. Don't take a hat with political propaganda on it. Don't even take any tee shirts with political propaganda on them. If you do take any tee shirts, put them aside."

#2: "Viva Mexico and death to the bad government."

#1: "God give us a blessing for all of the Mexicans and we'll see you Monday."

The photo was shot in Guadalajara July 12, and shows political workers from the opposition (Democratic Revolutionary Party).

The ripples from last summer's assassination of the leading presidential candidate and subsequent events in Mexico have been spreading in ever-widening circles ever since. Tuned-in shortwave listeners understand better than most that, just like radio waves, sooner or later such ripples reach our shores as well.

## More on Marconi

■ Giovanni Serra of Rome, Italy, sent us the 2000 lire banknote commemorating Marconi's contributions to radio (see this month's "Radio Reflections"). The banknote, reproduced in January's "Letters," is of interest, because apparently the telegraph pictured was not Marconi's! Giovanni now has a few more details to add, courtesy of an article by IW2BSF, which he translated for us from an Italian ham radio magazine, *Radio Rivista*.

"[The error] was discovered by a studious fan of Marconi's from Bologna, Italy. He explained that the differences between the two machines are microscopic: the Marconi device was constructed with two fixed magnets, a coil of wire with the winding for the antenna, and an earphone. It worked with a winding mechanism. The device pictured on the note can be attributed to an obscure electrician of Milan, Giovanni Campostano who constructed it a little more than two years after Marconi's invention. In fact, it worked with a less sophisticated engine, because the electric sparks this rough engine caused, interfered with the reception of radio signals.

"You can compare the radio device pictured on the banknote with Marconi's original device, which is displayed at the Science and Technology Museum in Milan."

## Treasures Under Your Nose

■ In response to Uncle Skip's March column on parts procurement, Steve Moyzis (alias

(Continued on Page 114)



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<b>LOW BATTERY IND.</b>	NO	YES	YES	YES
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## This is Serious

■ Many radio system operators, it seems, are only marginally aware of the many facts, circumstances and laws that can affect their licenses. In the March 1995 issue of *Mobile Radio Technology*, author Robert Schwaninger, Jr., reports that one former FCC licensee was found to have abused its license for operation of a Public Coast Radio Service station. The Commission, he says, found that the station was using Special Emergency Radio Service channels to order liquor supplies for a brothel.

When asked to explain the situation, a representative of the licensee responded, "When you run out of liquor at a whorehouse, it is a special emergency."

## Radio Blockade

■ The sixth congress of the Community Radio World Association in Dakar, Senegal, unanimously approved a resolution condemning U.S. "electronic aggression" against Cuba. For 30 years, says the CRWA, the United States has blockaded Cuba, "damaging its communications by preventing access to information and impairing its teaching and cultural roles."

The CRWA has demanded that the United Nations use whatever means necessary to ensure compliance with its decisions.

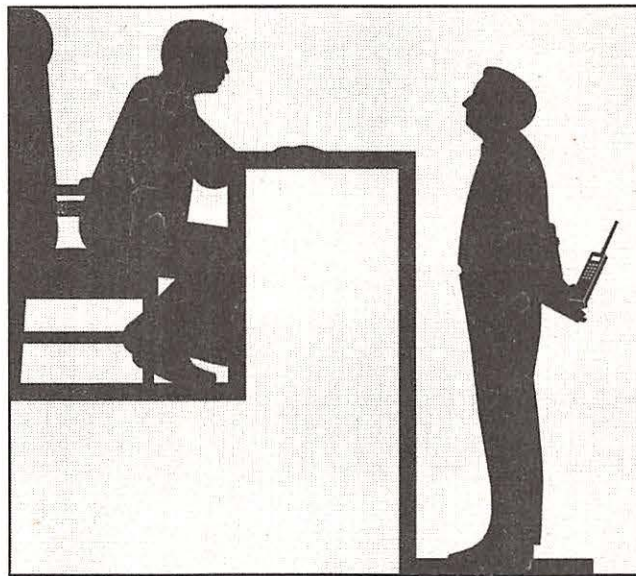


## Bye Bye Radio?

■ Ever since the earliest days of radio, the U.S. government has forbidden foreign ownership of broadcast stations. Now all that may change if Representative Michael Oxley of Ohio has his way.

Oxley was scheduled to conduct a House Commerce subcommittee hearing on repealing the anti-foreign ownership provision of the Communications Act of 1934. Oxley feels that opening the U.S. broadcast media to foreign ownership would encourage other countries to relax restrictions against U.S. telecommunications carriers and U.S. equipment providers.

If the subcommittee does recommend lifting the ban, it would next come before the House Commerce Committee and, later, the House floor for a vote.



## Look but Don't Listen

■ Listening to the radio can be hazardous to your (financial) health in England. But things are looking up.

According to unconfirmed reports, Colin Clark of Watford was fined £1,500 in a local Magistrates Court for listening to a pirate station on 106 MHz FM. The British Radiocommunication Agency, which polices the airwaves, repeatedly warns radio hobbyists that they can legally listen to only "authorized" radio broadcasting stations, amateur, and CB, and certain marine meteorological and time signal stations intended for public consumption.

To make matters more confusing, say our sources, it's legal to sell scanners, and to buy and own them, but not to use them to eavesdrop on "unauthorized" radio services.

So how is all of that "looking up"?

We're told that Mr. Clark has appealed his sentence and his fine was halved. His radio was also ordered returned. We're told that Mr. Clark's original fine was more than that usually handed down to the people who actually run or finance pirate stations.

## Going Digital

■ Arinc is demonstrating the use of digital data transmissions for ground operations at Washington's National Airport. The technology being used is quite similar to ACARS (Aircraft Communications Addressing and Reporting System) that currently ties airliners and ground operations bases together.

The new system will be used to manage deicing and baggage personnel, but is expected to expand to maintenance and catering

as well. Mobile units on the ground will use Ericsson radios employing voice and data capability to communicate over the EDACS Trunked Radio System. USAir and Continental Airlines are participating in the testing.

## National Mutual Aid

■ In response to a 1993 Congressional mandate, the FCC's Public Safety Communications Council has been looking at future requirements for disaster management. High on the scale is the need for a National Mutual Aid/Emergency Response Communications System.

Such a system would include a National Call Channel, a National Incident Command Channel, National Hazardous Materials Response Team Channel, National Disaster Channel, interface and support of local operations through 911 emergency number operations, Fire/Police/EMS Incident History Reporting and data transfer capability, plus support for Emergency Command Post Operations. This will allow vital interagency communications at the local, state, and federal levels during a disaster. Implementation should occur soon after additional radio spectrum is allocated.

## Scanners Used in Theft Ring?

■ Three Denver, Colorado, men were arrested on numerous charges relating to a nationwide computer theft, counterfeit check, and forged driver's license ring. Newspaper reports state that the U.S. Secret Service was called in after police detectives seized evidence which included radio frequencies for the White House, Air Force One, and NORAD. So far, we have no word on what actions, if any, will be taken against the men because of the possession of these frequencies—which in itself is not a crime.

## FM Pirate Raided

■ WEFX was a true pirate. The Holbrook, New York, station broadcast on 87.9 MHz FM using equipment systematically stolen from at least three remote broadcast sites belonging to other radio stations in the Long Island area.

After six weeks of investigation, 24-year-



old Joseph Caracciolo was arrested from his broadcast post in a room packed with equipment in his mother's home. Twenty-five feet above roof-level sat a back-up antenna belonging to station WALK.

"From what we can determine, there's no way he made a profit," said Suffolk Police Detective Sergeant Larry Boyle. "He was strictly a radio buff." Nevertheless, operating an unlicensed radio station is a federal offense. The thefts of equipment caused substantial damage to property and equipment of several stations in the area.

## Station Supported by Plastic Ducks

■ In the town of Telluride, Colorado, public radio station KOTO-FM is the only station that residents can hear; mountains block out all other stations. But that's OK with most residents.

So how have the people of Telluride been handling the ongoing discussion about cutting federal funding to public radio? Noooo problem. Even if National Public Radio lost all of its federal funding, KOTO-FM would remain on the air. The station, which broadcasts city council meetings, matches lost children with their parents, and warns people at summer festivals to wear sunscreen, has an annual budget of only \$170,000 a year.

"If we lost our funding," says Ben Kerr, KOTO station manager and founder, "we'd just have to find a new way to do things." Already, the station's fund raising efforts are legendary. It holds the beer concession at the annual Bluegrass Festival. That brings in \$40,000. A ski swap brings in \$8,000 a year, and KOTO's summer duck race—500 yellow plastic birds compete for first place—nets the station another \$5,000.

So how about letting businesses donate money in exchange for on-air credit? "No," says Kerr. "We're non-commercial. The mercenaries would take over."

## Distress Call Shenanigans

■ According to George Byron Smith's girlfriend, the 55-year-old unemployed electrician is a "regular nice guy." In fact, she was shocked when Smith was arrested for making phony distress calls. Smith used a handheld radio to report the sinking of two ships over a period of several weeks. The reports sent Coast Guard ships and helicopters racing to the area only to find no emergency. Smith also tied up Marine Channel 16 with profanity and threats to the local Coast Guard office.

Eventually Coast Guard and FCC direction-finding equipment traced the calls. Smith was indicted on six counts of making false distress calls.

"Communications" is written by Larry Miller with help from Laura Quarantiello, Rachel Baughn, and the following members of the Communications Media Monitoring Team: David R. Alpert, New York, NY; Anonymous, Albany, NY; Michael Barnett, Huntersville, NC; Kenneth Borndale, East Northport, NY; Andy Cadier, Kent, UK; J. Harold Eads, Fincastle, VA; Dawson Heron, Concord, MA; Tom Hodge, Jacksonville, FL; Kevin John Klein, Appleton, WI; Jack McCartan, Newark, DE; Ricardo

Molinar, NJ; J.A. Moran, Tempe, AZ; Richard Neuber, Denver, CO; Clive Ridpath, Soquel, CA; Doug Robertson, Oxnard, CA (Happy retirement, Doug!); Richard Sklar, Seattle, WA; Phil Yasson, Vancouver, WA. We also consult the following publications and we list their names in appreciation: BBC Monitoring *Summary of World Broadcasts*, *National Scanning*, *Radio World* and *W5YI Report*.

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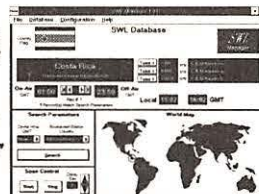
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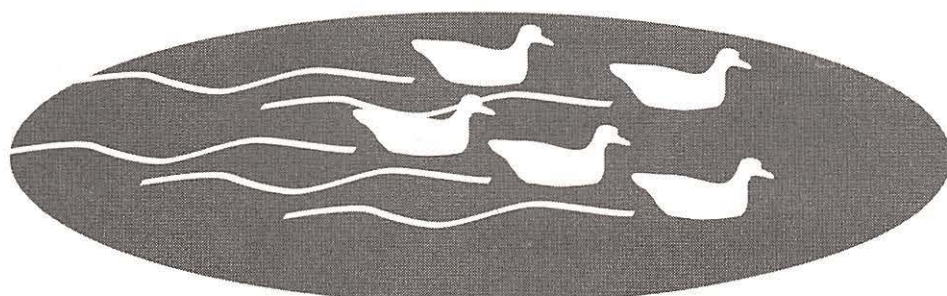
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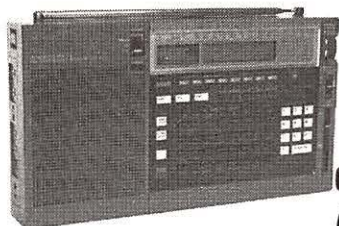


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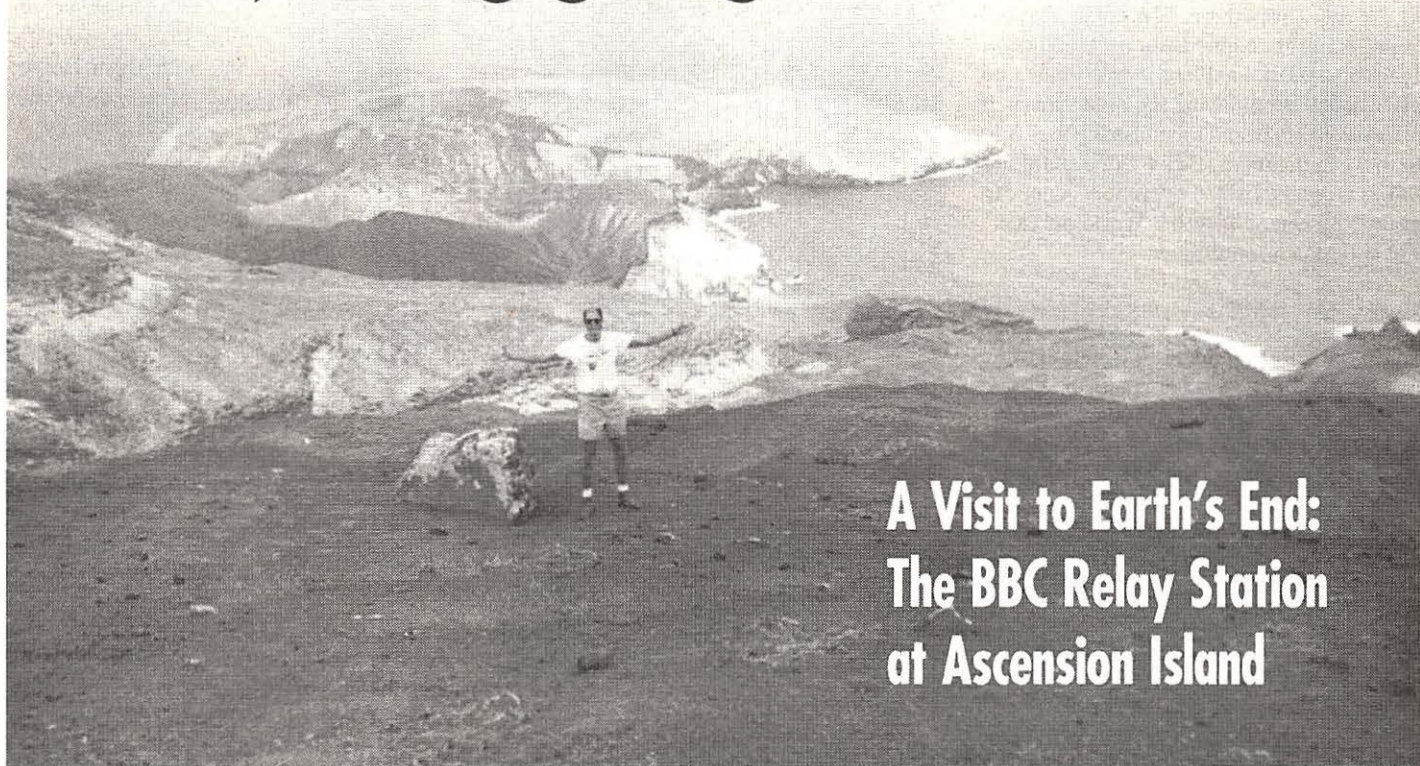
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# Leapfrogging the Atlantic



## A Visit to Earth's End: The BBC Relay Station at Ascension Island

*In all of its glory: the author stands near the old NASA Tracking Station (now abandoned) at Devil's Cauldron. It's about 2,000 feet down to the South Atlantic Ocean from here!*

**By Stephen W. Worden,  
NN3M/ZD8NN**

**T**he station erupts into a flurry of activity as the hour approaches. Quick fingers and calculating eyes dance across ranks of switches and meters. Indicators rise to waver at new heights. From the monitor, the words "*This is London*" confirm that all is well, as thousands of listeners around the world hear the BBC Atlantic Relay Station begin its broadcast day.

In the center of the main panel I watch a meter calibrated in megawatts. Labeled "Station Load," it is the focus of everyone's attention. One minute ago, a steady 2.8 MW was registering. Now the figure fluctuates between 4.1 and 4.3 MW and tracks the modulation of the World Service audio perfectly.

This is the Control Room of the power generating station on Ascension Island, in the South Atlantic Ocean. I am here with friend and "tour guide" George Arthur Talbot (ZD8GT/AH6H), visiting the British Broad-

casting Corporation transmitter site, watching the World Service come to life, and loving every minute of it!

### ■ Tiny Pad Launches a Powerful Hop

Knowing I am a newcomer to the island, Bill Mason, the Power Station Manager, gave me a wonderful description of how pleasant life is there. And he certainly should know, since this is his second assignment—his first tour being from 1980 through 1984. I mentioned how favorably impressed I was with the friendly nature of everyone I met, and Bill confirmed that this is the norm.

"It's marvelous," he said. "You don't lock a car, you don't lock a house. The children—you wave good-bye in the morning, and they come smiling in at noon—all without a worry. It's a marvelous place—it's the quality of life."

He was right. Everywhere I went, people smiled and said hello. Cars were left open, their keys in the ignition. And at the Exile's Club in town—the former Royal Marine barracks built in 1832—the bar remains un-

locked twenty-four hours a day. Members use an honor system, which, believe it or not, really works.

Bill Mason has a huge responsibility—managing the production of power and water for practically the entire island—but he loves this challenge and has terrific enthusiasm for his job. It is easy to see that he loves his work.

There is certainly plenty of work involved. Although Ascension Island is a tiny place with comparatively few residents, Bill's main customer uses as much power as an entire city. The British Broadcasting Corporation's electric bill must be millions of dollars a year! To meet this need, Bill has a round-the-clock staff of about fifty operators and technicians, plus a handful of engineers.

He also has a cavernous building filled with huge, screaming generators. Beside them, George and I could only communicate with hand signals—our voices were overpowered by the din of the seven Allen V-12 diesels. Even yelling didn't work. The sound level was above my threshold of pain.

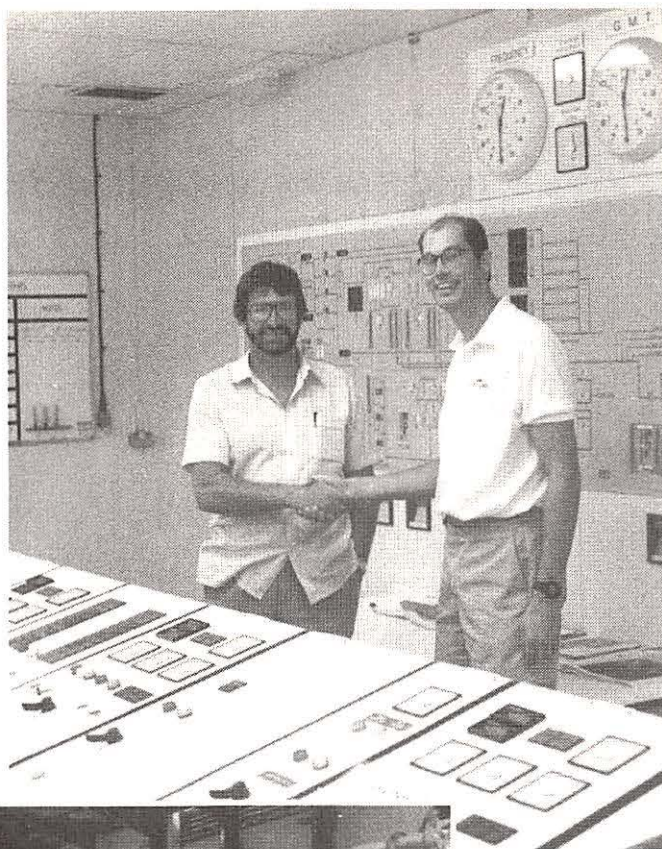
Bill told us that each plant produces 1.33

MW. Three or four generators on-line meet normal loads, with others on stand-by, and one, perhaps, "cooled off" for maintenance. A plan of continual re-engineering gives them a twenty-five year life span.

The rockers from one of the engines were off the day I was there. The engine looked "mint"—freshly painted, almost brand-new. Even so, the BBC has plans for modern, more efficient power producing equipment that will take Ascension Island broadcasting well into the next millennium. Bill's work and planning is critical to island operations, done "to ensure you can all hear the World Service," said Bill Mason, smiling.

### ■ Acres of Antennas

Up the hill from the Power Station is the Transmitter Site. It was here that George and I visited with Jeff Cant, a long-time BBC engineer and manager, who kindly showed us around the grounds. An engaging speaker,

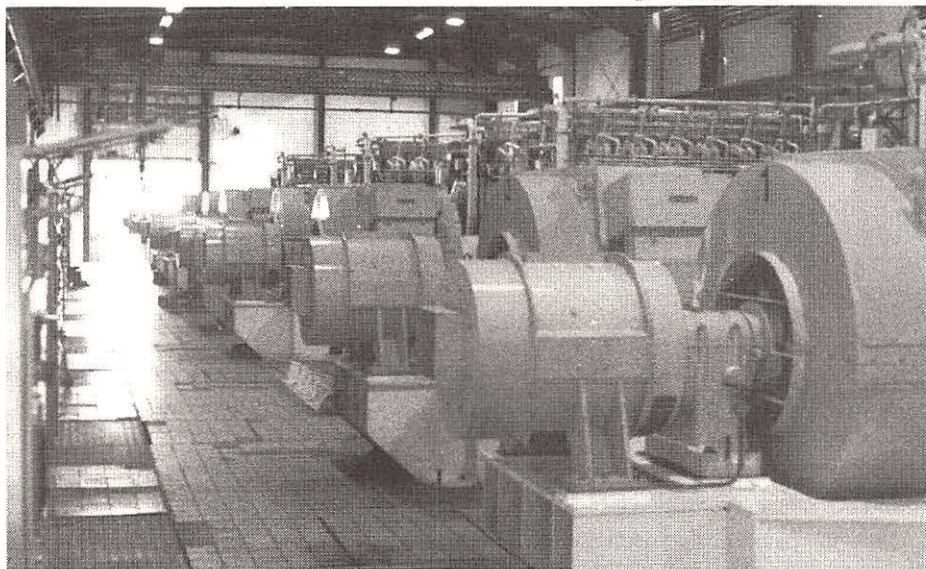


Jeff provided a wealth of information concerning the Atlantic Relay Station's history and operation. We stood on a hill overlooking the Andrews ten-meter satellite dish, the island's link with Bush House, and talked about the station's beginnings.

"Basically, this place was built in 1966. It's here because this island is good for radiating both to South America and West Africa," said Jeff. That continues to be its role today, although many other things about the operation have changed.

Looking down at the giant white saucer, Jeff recalled, "We originally used HF feeds until this dish was installed nine

years ago. There's a little HF receiving site on the other side of Butt Crater. We do keep the HF back-up going, because it is very useful. What I didn't realize—having had nothing to do with satellites—is that you lose the signal twice a year. When the satellite approaches the sun you lose the whole thing. You have to switch the tracking off, otherwise it will lock onto the sun. So twice a year you lose it for about a quarter of an hour for a week or so.

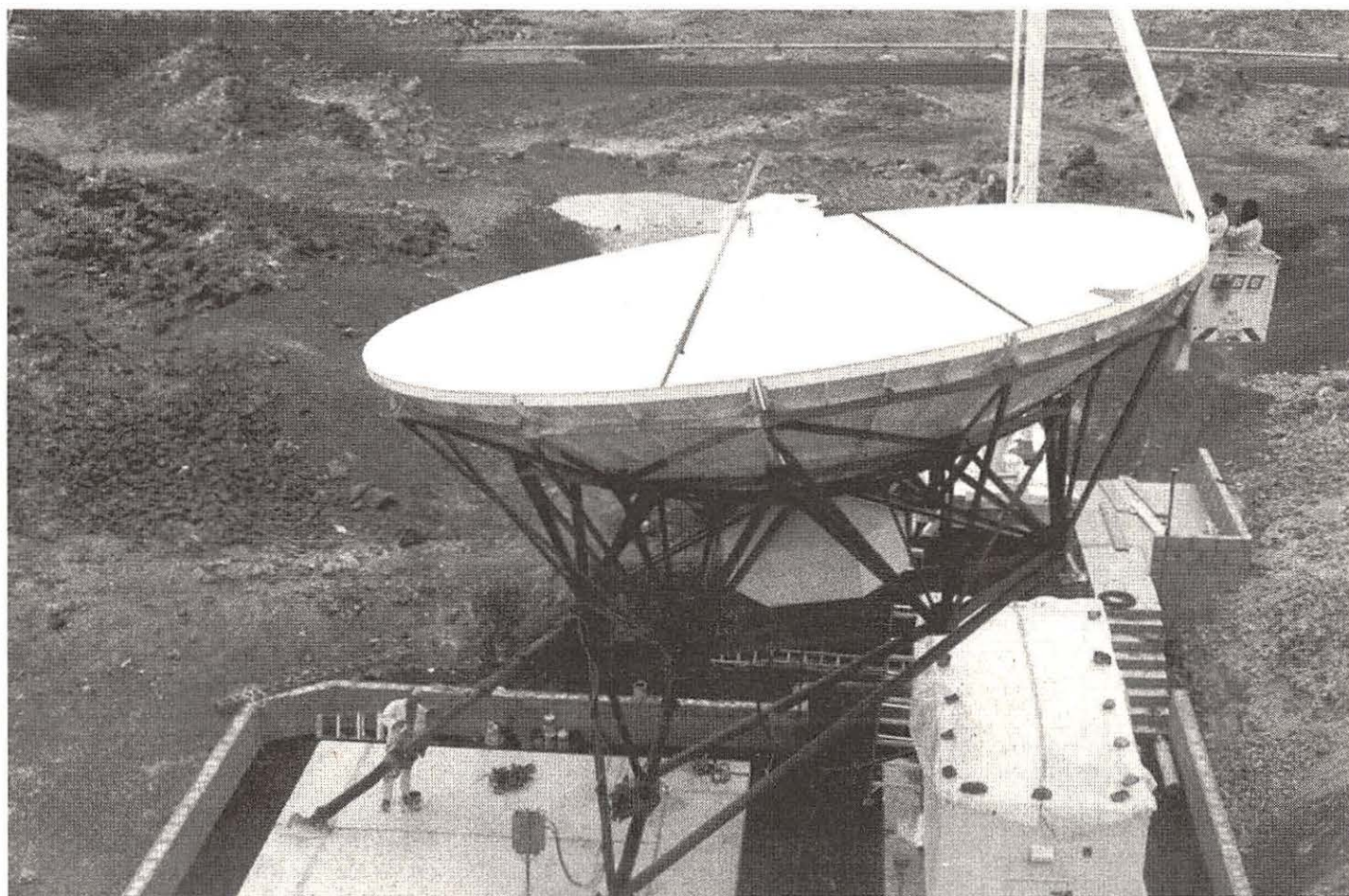


*Top: The author with Bill Mason, Ascension Island Power Station Manager, in the Control Room. The large clocks are used to gauge AC frequency error.*

*Middle: The generator room, alternator side. Each plant develops 1.33 MW output.*

*Right: Some of the original antenna arrays from 1966.*





*The island's tie to Bush House: an Andrews 10 meter downlink dish. Notice the maintenance crew in the cherry picker.*

This, naturally, happens during one of our quite popular program times, so we're trying to keep the HF station still going."

Overall, the satellite feed has improved quality and reliability, and simplified operation, although Jeff expressed concern that the sensitive microwave receiving equipment provided a single point of failure. (Another reason for the HF back-up capability.)

"But the system works perfectly well for our needs," he said. "We get six channels on it, which we use to produce three music circuits." The appropriate audio circuit is switched live to the correct transmitters at broadcast time.

By the way, Jeff called the transmitters "senders" sometimes, on which the operator performs a "wave change," not a band change. Ascension Island is definitely British territory!

The transmitter site is located right along English Bay, on the northern coast of the island. We surveyed the bay and antenna farm as Jeff continued. "The whole thing is built around a horseshoe (the bay), so we have a good choice of bearings. Those (pointing to the nearest antenna array) are fairly standard

BBC antennas. They have a form of four elements across the top, and four elements high. They're reversible, and you can normally get three bearings off the front, and three off the back. And you can use just half the curtain to give you a bigger beamwidth—seventy degrees, instead of thirty-seven."

"We originally only had four transmitters. In 1988, we installed two more and installed these extra antennas down here." (Nodding toward an enormous array supported by 100 meter towers.) "That's the new three-band array—made by a California company—designed for one-hop coverage to all our target areas."

A hundred acres of "clinka" (clinker—volcanic rubble) are devoted to the array field. Towers and distribution poles by the dozen with a faint silvery webbing march like columns of soldiers across the desolate landscape. It is broadcasting in a very big way.

### **Vintage Transmitters**

Jeff now led us into the operations building, where the six Marconi senders reside. Large and well-built, these transmitters pro-

duce 250 kW of RF, and are almost as reliable as gravity.

We stood in front of Sender 304. Jeff explained, "When these first came out, in the Sixties, they had a crystal drive. Then we had a Marconi frequency synthesizer. Since 1988, we've used Hewlett-Packard signal generators because what we've got here is an automatic control system that operates these transmitters. But it's not fully automatic with automatic stages. Someone still has to go in, do the wave change, and tune the transmitter. The arrays are all automatic."

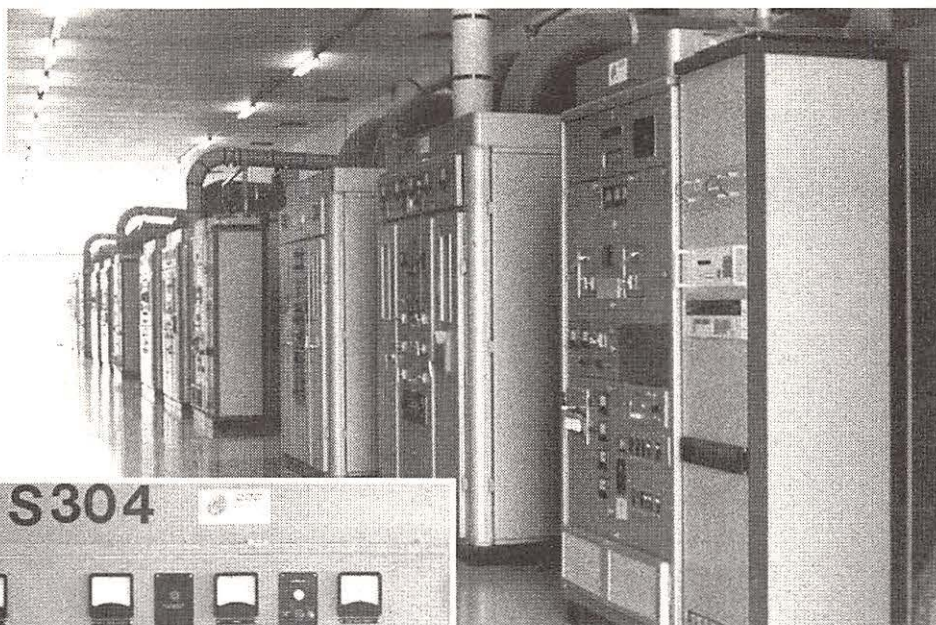
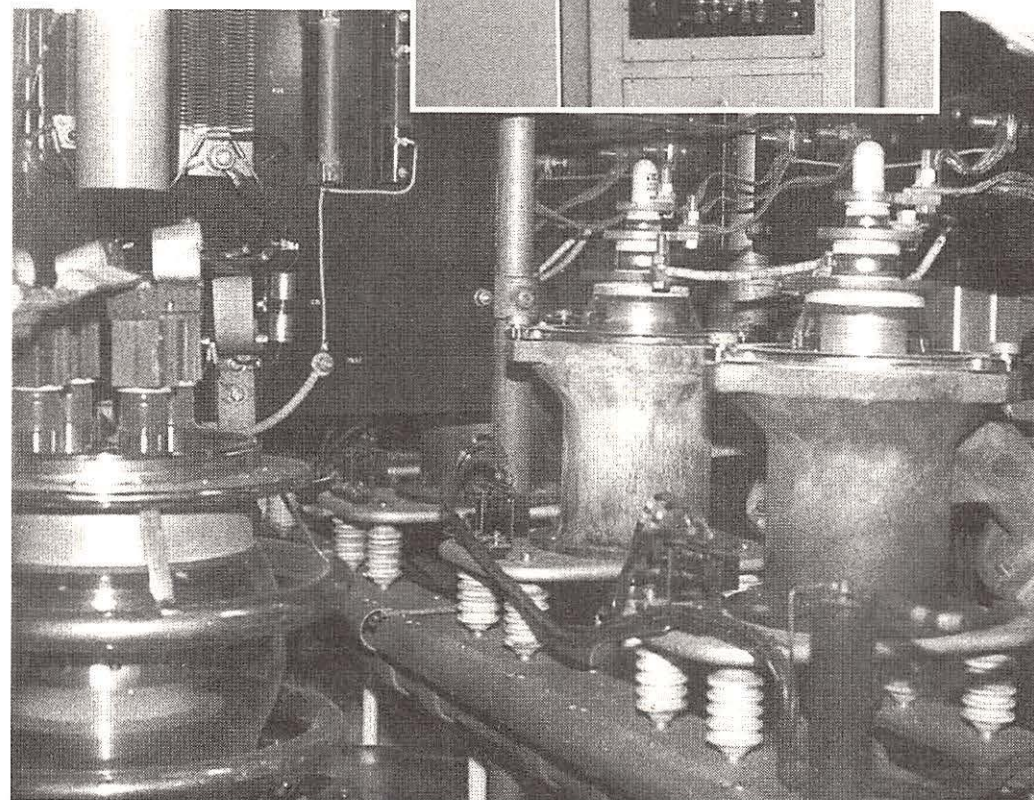
Jeff told me how his programs are delivered. "Our schedules come from the Broadcast Coverage Department in London. They do all the calculations there—propagation analysis and so on. The program people want their programs broadcast when people are getting up from bed to listen. They don't want to broadcast during the hours listeners are at work or in bed. It's quite a complex business—arranging a schedule, knowing who you're broadcasting to, what time your audience is going to be there, what's the best frequency, and getting everybody to agree on it internationally. And then publishing it!" I

shook my head—it's a lot of competing requirements.

The senders, to me, are marvelous pieces of engineering. Built in three sections, each the size of a small mobile home, they are gray boxes full of copper plumbing, glowing filaments, and meters. Phil Brooks, Senior Shift Engineer, took me *inside* Sender 306.

"About five minutes is all it takes to make a complete bandchange," said Phil as we walked past the Apparatus Room. "The operators go through each stage, switch in the correct capacitors, and bolt in the coils. That's what these are," he said, stopping us in front of a rack full of silver-coated coiled pipes. Each pipe was about an inch and a half in diameter, and the coils ranged from ten inches in diameter for 21 MHz, to a gigantic four feet for 6 MHz.

Phil busied himself at the interlock panel, throwing switches, pushing buttons, and removing keys so that the sender was *very* off when we went inside. He used the keys to unlock the side doors on the Power Amplifier bay, opened them up, and went over the rig with me in detail. As he warmed to his interested audience, his enthusiasm for his profession was evident. I found Phil's knowledge and "war stories" both entertaining and impressive.



*Above: Inside the BBC Atlantic Relay Station Main Transmitter building, with the four original Marconi "senders."*

*Left: Sender 304, the first BBC transmitter operational on Ascension Island.*

*Below: Inside sender 304. Power amplifier tube on the left, output stage on the right. A built-in hoist is used to remove the tube.*

Phil was part of the original operations staff the BBC sent to Ascension in 1966. "When I first got here, there was no office, no running water on-site, and Marconi was still at work, installing the senders you see over there," pointing down the hall from Sender 304. "All the signal feeds were brought in from the receiving site at Butt Crater. The operation was completely manual in those days, and the work was very satisfying."

Phil was proud to have been part of the initial crew, and said, "If there is one site that I really identify with, this is it. When I left, I never thought I'd see Ascension again, but here I am after twenty-five years, trying to remember what we did back then!" In fact, when the BBC Atlantic Relay Station began its operation, Phil was on duty and had the honor of making the first operational switch that put the World Service feed out to Sender 304.

The pace of that operation is still

*"Our schedules come from the Broadcast Coverage Department in London," said BBC Staff Manager Jeff Cant. "They do all the calculations there—propagation analysis and so on. The program people want their programs broadcast when people are getting up from bed to listen. They don't want to broadcast during the hours listeners are at work or in bed. It's quite a complex business—arranging a schedule, knowing who you're broadcasting to, what time your audience is going to be there, what's the best frequency, and getting everybody to agree on it internationally. And then publishing it!"*



brisk. Teams of technicians and operators move as a unit to perform a wavechange. Many different alarms hoot, beep, and chime as transmitters are readied, audio circuits cued, and antenna arrays selected. At one alarm, Phil suddenly whipped around and checked a video monitor above us, then bolted for a sender. I hustled after him, and watched as he brought the transmitter back to life—it was just coming on-line, and had tripped its HV breaker at start-up.

### ■ Hospitable People in Harsh Surroundings

As we left the station and drove back to Georgetown, I was struck again by the monumental strangeness of the island's terrain. It is a barren landscape—a world gone vertical, where all is jaggedness and rock. Everything I saw was stark, immutable testimony to the seething forces that had squeezed incalculable masses of molten stone until an island boiled out of the earth.

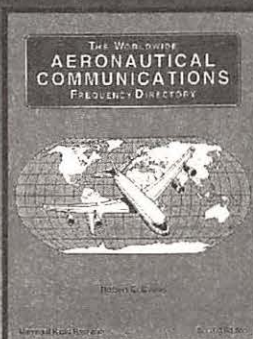
Huge, sharp flows of living rock, now as still as a photograph, detail the moments of the island's birth. High, toothed ravines are narrow and steep, lined with knife-edged spires. Rock debris and wreckage—the remains of volcanic excess—are raggedly strewn in lifeless valleys. Dozens of volcanoes encircle each other, pressed together, their long cracks and ridges ever-grinning, ever-menacing.

It was there, on that "frowning mound of slag," that I met some of the nicest people on Earth. You will, too, if you are fortunate enough to go there.

So ends our glimpse into world-class in-

ternational broadcasting from this remote location. My heartfelt thanks go to those who made this article possible, especially George Arthur Talbot and the fine staff of the BBC Atlantic Relay Station.

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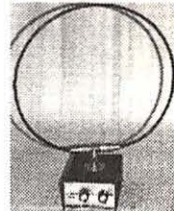
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# HISTORY

*The first Electra/Bearcat scanner, model BCH, surrounded by a Clark 450 and two Tompkins Radio Tuneavers—converters used with AM broadcast receivers.*

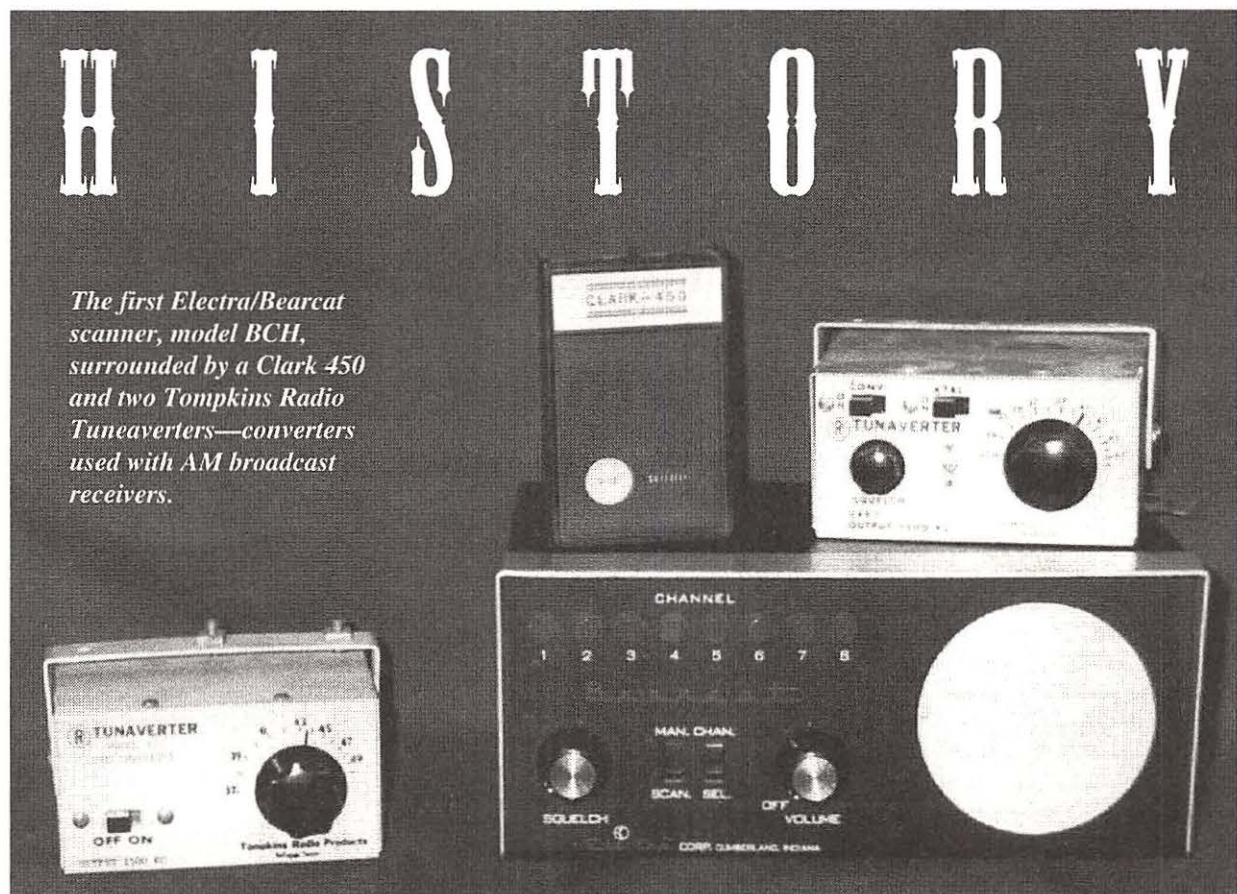


Photo by Pam Parnass, N9HRZ

## A SCANNER COLLECTING PRIMER

By Bob Parnass, AJ9S

**S**ome people collect stamps. Others collect baseball cards and coins. My passion is collecting, restoring, and using scanner radios and monitor receivers. This article presents a brief history of monitor and scanning receivers, and gives helpful tips on starting your own scanner collection.

You probably know brand names like Bearcat, Regency, and Radio Shack, but more than 60 brands of scanning and monitor receivers have been sold. The accompanying tables will give you an idea of how many scanners are out there are to collect!

### LIFE BEFORE THE SCANNER

#### ■ Monitor Receivers

The precursor to the scanner was the tunable monitor receiver. From the 1950s through the late 1960s, Regency, Gonset, Squires-Sanders, Lafayette Radio, Allied, and other companies offered tunable tube models.

The dial calibrations on tunable models were very coarse. Two-way FM radio users of that era transmitted using twice the bandwidth

of their modern counterparts. Channels were spaced at 30 kHz intervals on the VHF-high band, and the sparse dial calibrations on a tunable 150 - 174 MHz receiver could not resolve 800 different channels. This made it difficult to tell one frequency from another and hard to tune unless the desired station was transmitting while the listener was tuning.

Monitor owners improvised. It's common to see pencil lines and hash marks hand drawn on the front panels of tunable monitor receivers.

In the late 1960s, solid state receivers began to replace their vacuum tube counterparts. Some models, like the Radio Shack PRO-2, featured both tunable and crystal control. Because dial calibrations were coarse and dial string tuning mechanisms imprecise, both tube and transistor tunable receivers had poor selectivity.

As the VHF bands became more crowded, the FCC mandated that two-way radio users convert their wide band transmitters to narrow band to conserve spectrum. Sharp filters and budget tuning mechanisms don't mix. Tunable wide band monitors drifted and weren't up to the task of separating a band filled with narrow band signals. If monitor receivers were to become more stable and selective, the cheap

tuning dial had to be abandoned in favor of total crystal control.

Sonar, a Long Island radio manufacturer, introduced better-performing, narrow-band, crystal-controlled receivers, like the 1968 Sonar FR-105. These units did not scan. Instead, channel selection was accomplished using a simple rotary switch. The record for the most channels in a crystal-controlled monitor receiver had to belong to Sonar's 24 channel models, the FR-2512 and FR-2513, in which crystals were held in a rotary "tur-ret."

Fixed channel crystal models allowed listening to only one frequency at a time, though a dual simultaneous receive option was available on the Plectron Patrol model.

### ■ A Different Approach—The Converter

During the 1960s, VHF and UHF converters appeared as an alternative to buying an entire receiver. Manufactured by Vanguard Labs, Tompkins Radio (Tuneaverter), Petersen, Bearcat (Lil Tiger), Midland, Clark, and others, converters were made to operate in conjunction with AM radios. They translated VHF and UHF signals down to the AM broadcast band where they could be heard on a conventional broadcast receiver.

Portable converters used the principle of induction to couple a signal into the ferrite antenna of the AM radio, requiring the converter and radio be placed side by side. The typical mobile converter was inserted between the AM radio and car antenna using a coaxial jumper cable.

While the Bearcat converters required crystals, the Midland converters were equipped with a slide rule type tuning dial. The deluxe Tuneaverter models could be tuned by either crystal or tuning knob.

Like tunable monitors, converters are interesting but don't work well by today's standards. They had poor selectivity and even the solid state models had drift problems.

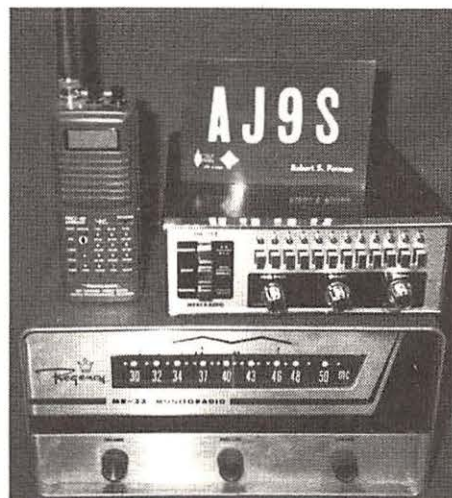
### ■ The First Scanners Required Crystals

As two-way radio use grew, consumers required a receiver which could monitor more than one frequency at a time—a need filled by a scanning receiver.

Perhaps the best-known first-generation scanners were Bearcat and Regency units, both made in Indiana. The first Bearcat models BCU, BCH, and BCL, appeared in 1968 and were rather crude, providing no way to lock out channels from the scanning sequence—an omission corrected a year or so later.

Electra didn't term these innovative radios "scanners," but instead called them "business receivers." In 1969, Regency started selling the classic TMR series Monitoradio Scanner, and Sonar weighed in with the FR2514 and FR-2515 Auto-Scan FM Monitor Receivers, recognizable by the lack of individual channel lockout switches.

The first scanners were separate VHF-low and VHF-high band models, followed by dualband VHF models. As two-way radio users populated the 450 - 470 MHz band, consumers had to buy a separate receiver for

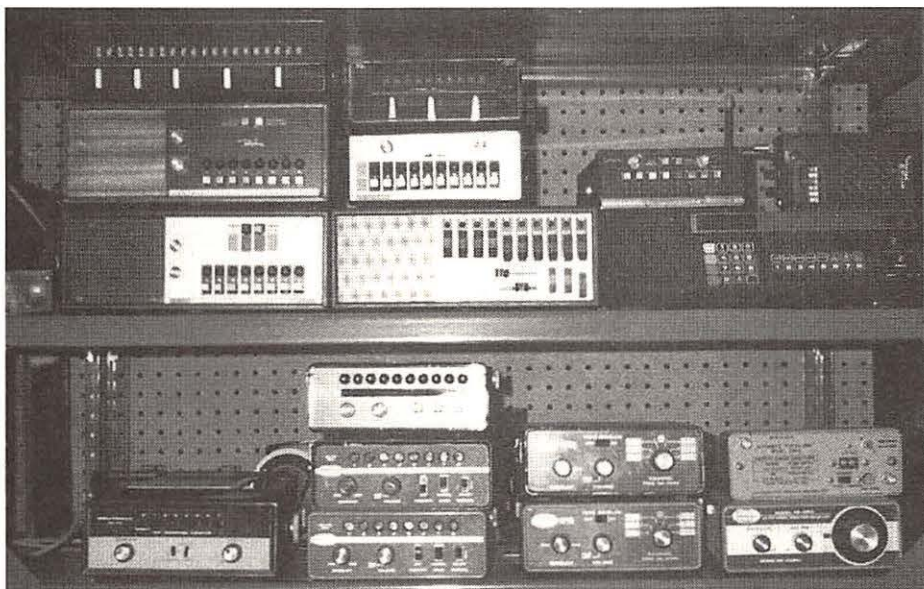


*Rare Mercradio SM-112 solid state crystal scanner (top). Regency MR-33 tube type tunable VHF-low band monitor receiver (bottom). Current Radio Shack PRO-43 portable scanner shown for comparison.*

UHF coverage. The public needed triband scanners, and in 1973, Electra introduced the Bearcat III, a multiband model which required an optional circuit board module for each band. The Bearcat III could only hold two modules at one time, but at last listeners had one radio which could cover both UHF and a VHF band. Electra's flirtation with optional modules was shortlived and UHF coverage was included as standard in later models.

Although "Yankee Ingenuity" shaped the development of the scanner, significant advances were being made in Japan. General Research Electronics, a Tokyo-based electronics firm which manufactures scanners for Radio Shack, was responsible for several innovations. In 1972, GRE engineer Kazuyoshi Imazeki applied for the U.S. patents on the priority scan circuit and a circuit which skipped over locked out channels more quickly. The patents were granted two years later.

There were scanner mutations, designs which never evolved—odd combinations of AM broadcast receivers with VHF-FM receive capability, like the flamboyant chrome and turquoise Sonar FR-103 and FR-106 portables introduced in 1968. In 1971, Lafayette offered the Telsat 50 and Telsat 150 CB transceivers with tunable VHF receive capability. Other unique models include Electra's Jolly Roger and GE's Surveyor series. Judging by their short market lives, these white elephants didn't interest the consumers of that era, but are fair game



*Part of my scanner collection. Older radios on bottom shelf. Top shelf contains Electra/Bearcat scanners and Clark 450 converter. Other scanners shown include Robyn, SBE, Petersen, Teaberry, Radio Shack, Unimetrics, RCA, Fanon, Lafayette, Mercradio, and Sears models.*

for today's scanner collector!

The number of different scanners available to hobbyists peaked in the mid 1970s. Like the CB radio market, almost every electronics company was selling crystal scanners: Courier, Pearce-Simpson Gladding, Brown, RCA, Channel Master, Craig, Browning, and on and on. To differentiate one model from another, manufacturers added features like variable scan speed, variable rescan delay, priority, channel 1 bypass, etc.

### ■ Early Crystal-less Scanners

At \$5 apiece, outfitting a scanner with several crystals became expensive. Radio stores stocked crystals for only the most popular local frequencies, and ordering a crystal could take weeks. Crystals provided good frequency stability at the expense of flexibility. Looking for a way to make a drift-free scanner which didn't need crystals, manufacturers brought digital frequency synthesis—a

technology found in expensive military radios—to the consumer market in 1975.

The first synthesized crystalless scanners were difficult to program. Users had to look up frequencies in a code book and tediously enter the information into the scanner in binary form. The Bearcat BC-101, Radio Shack (GRE) COMP 100, and Tenelec MS-2 resembled old Altair and PDP-8 computers, with a row of 16 or so toggle switches and lamps. Instead of toggle switches, the Regency WHAMO-10 was programmed by breaking teeth from metal combs. One comb was needed for each frequency.

The SBE Optiscan and its licensed Sears variant required the user to poke a series of holes in a plastic card and insert it into a slot on the front panel. Each card could hold 8 - 16 frequencies, depending on the model. The cards and combs were not reusable, and replacements are difficult to find 20 years later. Taking one of these scanners mobile meant the user had to keep the code book handy, which was usually too big to fit in a car glovebox!

Many of the companies selling crystal scanners never made the transition to frequency synthesis and dropped out of the scanner market.

### ■ Keypad Entry and Digital Display

The next generation of programmable scanners, as represented by the 1976 Tenelec MCP-1, Electra/Bearcat BC-210, and Regency ACT-16K, showed advances both in how scanners were programmed and how frequencies were displayed. Direct programming via a keyboard and an unambiguous



*Regency scanners are on the top shelf; Heathkit and Sonar Radio receivers on the bottom.*

digital readout made them much easier to use.

Scanners and computers were first joined in tandem when in 1983 Electra offered the CompuScan 2100. It was the first scanner in which frequencies were entered using a personal computer. As a matter of fact, the 2100 could be used *only* with a computer, as it lacked a keyboard and frequency display. That brings us to today's generation of scanners, many of which can be programmed by both a keyboard and by an external computer.

## COLLECTING SCANNERS

### ■ Getting Started

At last count, there were over 70 scanners and monitor receivers of various brands in my collection. Collecting old scanners and monitor receivers is a relatively inexpensive hobby. Many people hold older, non-programmable receivers in low regard and will sell them cheaply—often in the \$3 - \$10 range. I purchase most of my old receivers at hamfests and garage sales, and sometimes horsetrade with other radio hobbyists.

Hamfests are probably the best place to find used scanners, but you must be familiar with the equipment. Electronic flea markets are littered with older radios you won't see in today's catalogs.

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**TABLE 1: Modern Scanner Brands**

*These brands are currently available or have been available recently.*

<u>Brand Name</u>	<u>Example Model</u>	<u>Remarks</u>
ADI	Sender 450	
Alinco		not sold in USA
Altai	COMMTTEL 203	Britain
AORAR1000		
Bearcat	BC200XLT	Uniden
Regency	R1040	Uniden
Camnis Cobra	SR12	Uniden
Commander		sold in Sweden
Fairmate	HP200	really AOR
Handic		currently sold in Sweden
Icom	R7100	
Kenwood	RZ-1	
Realistic	PRO-2006	Radio Shack, made by General Research Electronics and Uniden
Shinwa	SR001	
Sony	AIR-8	
Stabo	XR100	sold in Germany
Standard	AX-700	
Yaesu	FRG-9600	
Yupiteru	MVT-7000	called Jupiter outside USA

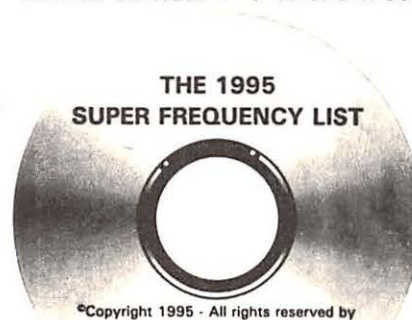
**TABLE 2: Monitor and Scanner Brands of Old**

*These are scanner brands of the past. Some of these companies offered only one or two models before abandoning the scanner market.*

<u>Brand Name</u>	<u>Example Model</u>	<u>Remarks</u>
Aaron		
Allied Knight-Kit		tunable models
Ameco	MP1H	
Azden		sold in USA under Regency label, e.g., Regency HX-1000
Black Jaguar	Challenger	
Browning	XM-888	
Channel Master	CS-6790	
Claricon	Sky-Scanner	
Courier	Cop-Scan	
Craig	4530	
E. F. Johnson	Duoscan	
Electra/Bearcat	BC-300	
Electrosonics Intl	Instalert	
Fanon/Courier	Scanfare M8-HLU	
Federal	Ten-Ten	
Fieldmaster	MF-200L	
Fox PB-100		
Gemtronics	Scanmaster 12	Gemeco
General Electric	7-2975A	
Globe	9700	
Gonset	MRS	
Hallicrafters	CRX-1	
Heathkit	GR-110	
HyGain	618H/L	
JIL SX-200		
Lafayette	Monitorscan 5B-8	
MacDonald		K-Mart?
Mercuradio	SM-112	
Morse-Electroponic	SC-600	
Motorola	Monitor	
Midland	13-950	
Pace	Scan 108	Pathcom
Pierce-Simpson	PR78-160	Gladding
Petersen	HL44	
Plectron	SM301	
RCA16S400		
Robyn	Hi-Bander	
Ross	Morse-Electroponic	
SBE Sentinel II		
Sharp	4530	
Squires-Sanders	FM Alert	
Sonar	FR-2515	
Surveyor	4VHF	
Teaberry	RA800	
Tennelec	Memoryscan MCP-1	
Truetone	234777	Western Auto Supply Co.
Unimetrics	Dura Scan-8	
Uticom		
Vanguard	FMR260	
WIN		
Signal	R535	sold in Great Britain

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obtain a few old Allied and Lafayette catalogs, especially from the 1960 - 1975 era, as they contain descriptions of many old scanner models. Hamfests are also good places to get the Sam's Photofacts scanner service manuals, now out of print. There were 15 volumes in the series (SD-1 through SD-15), and each volume covered several models. You can order reprints from Howard Sams Publishing by calling 1(800)428-7267.

## A Used Scanner May be a Broken Scanner

Getting a bargain is not without some risk. With crystal-controlled scanners, make sure you ask the seller's permission to inspect the insides of the radio. You'll want to know what, if any, crystals are included and their frequencies. This bears on the value of the scanner. Be sure to take a couple of small screwdrivers to a hamfest so you can remove the case or trap door to view the crystals. I once took a seller's word that his scanner was "filled with" crystals and didn't open his scanner for verification. I bought the scanner and waited to open it until I returned home, only to find no crystals! Experience is a stern teacher.

Sellers have looked me square in the eye and told me their radio worked fine—when it really didn't. For this reason, you should have some recourse if the radio you buy turns out to be defective.

If you can't fix the radio yourself, you can pay to have the manufacturer or a service clinic repair it for you. Several people have been pleased with Electronic Repair Center, in Franklin Park, IL, which repairs scanners for a flat fee. Call them at (708)455-5105 to find out their current rates.

G & G Communications (telephone 716-768-8151) is another scanner repair company. This family-run business repairs scanners and stocks parts for several older models. G & G is located at 9247 Glenwood Drive, LeRoy, NY 14482.

## Obtaining Crystals

If you do purchase a crystal-controlled scanner or monitor receiver, you will probably want to buy more crystals to cover local frequencies. Scanner crystals may be ordered from your local Radio Shack store or from one of the companies listed. Be sure to specify the operating frequency you want and the brand and model of scanner.

Some companies may ask you to send a schematic of the scanner or require more detailed information, like series or parallel resonance, load capacitance, etc.

Although they used a 10.7 MHz first IF, Sonar radios require parallel resonant crystals different from the common series resonant crystals used in Regency and Radio Shack scanners. Some Radio Shack crystals will work in Sonar units, but more often they oscillate a few kHz off frequency and are unsuitable unless changes are made to the oscillator circuitry.

American Crystal Co.  
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Jan Crystals  
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Cal Crystal Lab Inc.  
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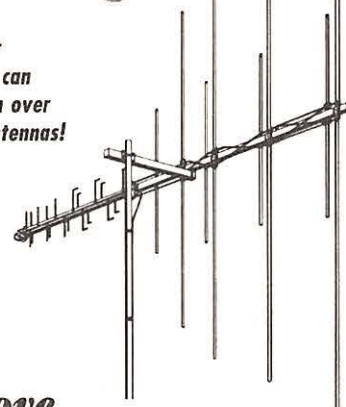


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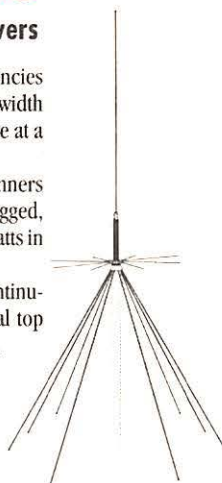
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# The Ups and Downs and Ins and Outs of ANTENNA GROUNDS

By Joseph J. Carr

A topic of almost perennial discussion amongst shortwave listeners, monitor buffs and amateur radio operators is the antenna ground connection. A lot of silly things are done in the name of antenna grounding; some of them work, some of them don't, and some of them are just plain dangerous.

Several examples pop to mind from my own thirty-plus years of experience. First, I recall a chap—a Novice class ham operator—who lived on the second story of a two-story frame house. He grounded his transmitter and receiver through an 18-foot piece of #22 solid "hook-up" wire. Besides the wire being too small and too long, the "lower end" was ridiculous: it was soldered to a fork stuck into the ground about one-half inch!

Another chap got a top flight electrical ground, but it was none the less ridiculous. In my area, we call this particular ground "Abe's bathtub" because the fellow grounded his ham rig to a massive antique copper bathtub buried six feet underground. Besides wasting a perfectly good (and expensive) antique bathtub, it must've been terribly hard to dig a hole large enough to bury it (*groan*).

Still another guy grounded the receiver to a pipe in the basement of his house—the natural gas pipe! That kind of ground is not only not very good from a radio point of view, but is dangerous and illegal!

My friend Dave was the chief engineer at a small AM radio station that was erecting a new transmitter site and antenna tower. Noting that there was no sod on the earth, he laid down a grid of copper wire for hundreds of square meters around the tower. Each row and column of the grid consisted of #10 bare copper wire, and the crossover points between rows and columns were soldered with low resistance silver solder. The entire grid was connected to the antenna tower's ground point. Then the sod company was called in to cover the earth. When

the power company came out, they found that Dave's ground system had a lower AC resistance than the ground they'd installed!

Only a few of us are rich enough to build "Dave's Ground Grid," and few of us own antique copper bathtubs that we are willing to sacrifice. But it's also true that many readers may not understand what is a good ground. In this article we will look at some aspects of antenna system grounds.

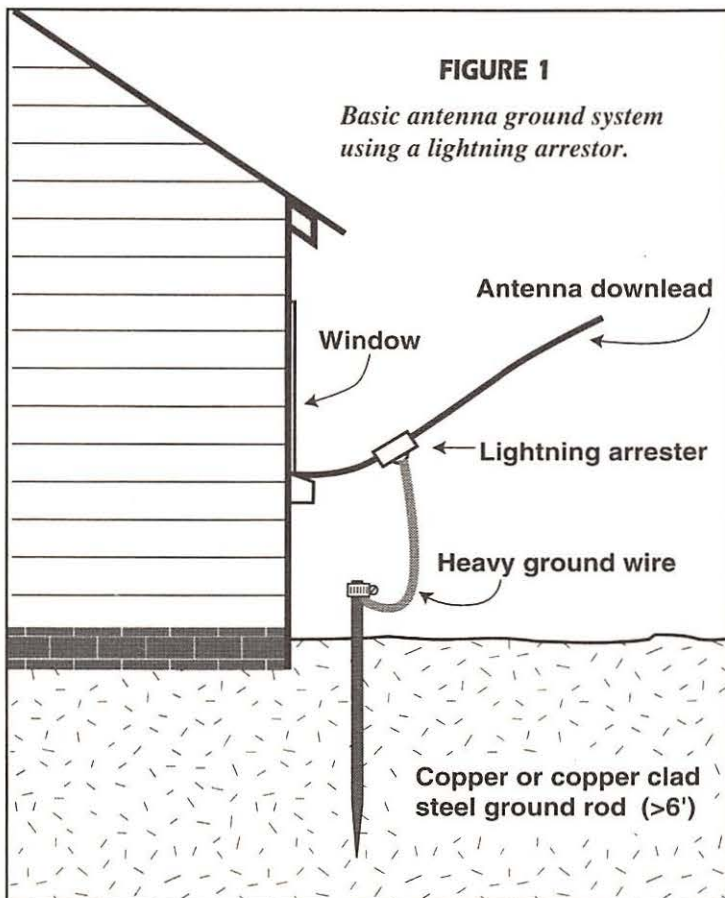
## ■ Why Ground an Antenna?

There are two basic reasons to build a ground into the antenna system: *lightning and electrical protection* and *to make the radio system work better*. Lightning protection is necessary because antennas sometimes get struck by lightning, and that can set a house on fire or ruin your radio (rather spectacularly, incidentally). Lightning is not "attracted" to the antenna just because it's an antenna, but because it is higher than other objects around (if a nearby tree is higher, then it has a higher probability of a strike).

A ground does not provide absolute protection against lightning, but it can help. For some types of antenna, local electrical and building codes require an appropriate ground for lightning protection. Also, your homeowners' insurance may require such protection in order to keep the policy in effect, especially if local codes require it.

Electrical protection is necessary because radio receivers sometimes short out internally, and that can put 110 volt AC on the chassis. If that happens, then the radio chassis becomes electrically "hot," and very dangerous (perhaps fatally so).

A "good ground" also makes radios work better under the right circumstances, especially with long wire or random length wire antennas (in fact, all so-called "Marconi" style antennas). Antenna



and center conductor are stripped away from the shield. Whatever type of wire is used it should (a) be legal under local electrical codes, and (b) be a large, heavy duty size.

#### ■ Basic Antenna Ground System

Figure 1 shows the basic (and most common) antenna ground system for lightning protection. A lightning arrester is connected into the antenna downlead (or transmission line) some place outside of the building. A heavy ground wire is connected from the "ground" (GND or G) terminal on the lightning

usually a machine screw and nut that is attached to the metal chassis of the receiver.

On some receivers, especially older designs, there will be a small phenolic or ceramic strip (see inset to Fig. 3) with either two or three screw terminal connections. If there are two screws, then one is for the single-wire antenna lead, and the other is for the ground connection. On three-wire types, there are two for antennas (A1 and A2) and one for ground (G). If an unbalanced antenna is used with the three wire type, a shorting wire is connected between A2 and G.

The ground system in Fig. 3 uses two ground wires. One goes from the ground connection on the back of the receiver to the ground rod, while the other goes from the ground connection on the lightning arrester to the ground rod.

#### ■ Switched Ground System

At one time, all ground systems for wire antennas used a large knife switch to connect the antenna to either the receiver or the ground wire, as needed. The idea is to switch the antenna to the ground side whenever a lightning storm approaches, or whenever the radio is not attended for a period of time. Figure 4

and radio performance is improved if the antenna system is provided with a good RF ground.

Lightning grounds, electrical safety grounds, and RF grounds are not necessarily the same thing. For example, a lightning ground that works through a lightning arrester may be a reasonably good protector for lightning, but is totally ineffective for RF or electrical protection purposes. The idea is to design a ground system that will work for all three functions.

#### ■ Ground Wires

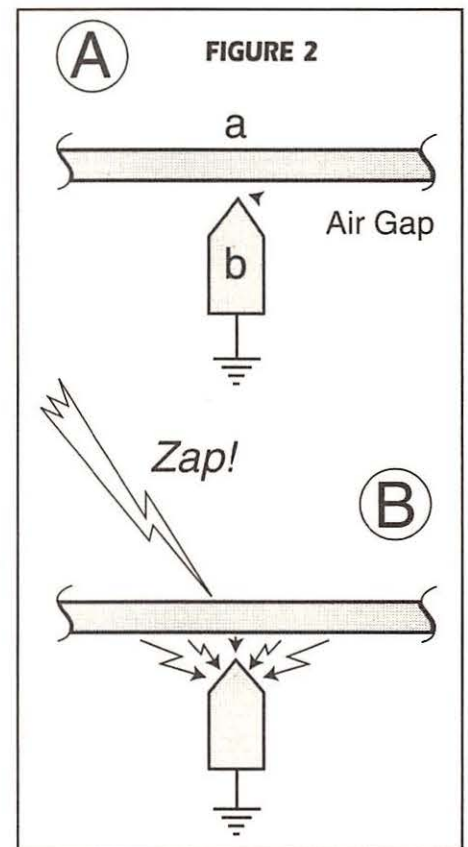
The ground wire, whether from the receiver or a lightning arrester, should be made of either aluminum or copper, and be as large as possible. Aluminum clothesline is sometimes used, as is aluminum TV antenna ground wire. Another popular form of ground wire is to use multiple sections of #12 or #14 house wiring connected in parallel at both ends. A lot of people use heavy copper flat braided wire, while others buy a roll of automotive battery ground wire. Still others recycle the outer braided shield of the larger size coaxial cable for the ground wire (RG-8/U or RG-11/U). The outer insulation, inner insulation,

rod driven into the ground.

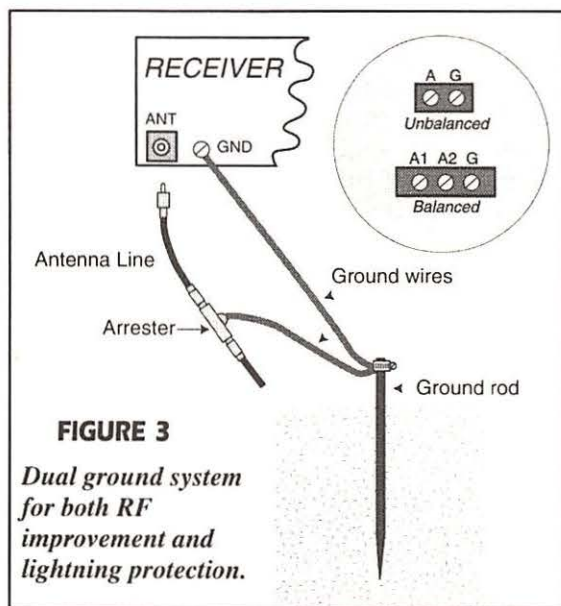
The "innards" of a lightning arrester are shown in Fig. 2A. The antenna lead is represented by a center conductor ("A"), that is separated from a pointed ground lug by a small air gap. The air gap is an insulator at low voltages, but when a high voltage lightning strike comes along, the air in the gap ionizes and creates a low resistance path to ground (Fig. 2B).

Ground rods are available in 4-foot, 6-foot, and 8-foot lengths. Although some are copper, most are copperclad steel. For lightning protection purposes, the 4-foot and 6-foot lengths are not the best choice. In fact, most local electrical codes require 8-foot lengths. For RF purposes, however, two or three 4-foot rods separated by a few inches, and shorted together above the surface with heavy wire will suffice. However, keep in mind that such an arrangement may not be legal for lightning protection ... If you want multiple ground rods, then drive several 8-footers into the ground.

A somewhat better system is shown in Fig. 3. On the rear panel of most modern shortwave receivers are two connectors: a coaxial connector for the antenna (ANT), and a ground connection (GND). The latter is



A) Structure of an antenna lightning arrester, B) antenna arrester in action.



shows such a set-up. The nice thing is that these old-fashioned switches are still available in some electrical or radio supply stores.

In the position shown ("A"), the knife switch connects the antenna download to the receiver lead; normal signal reception occurs. But if the switch is flipped to "B," then the antenna download is connected to the ground rod through a heavy ground wire.

A lightning arrester is used in the line. Just because the switch can connect the antenna wire to the ground side does not mean that no arrester is needed. Besides the fact that the switch can fail, there is always the possibility that a surprise storm or a lapse of memory will occur, and the switch will be in the wrong position.

### ■ Grounds for Vertical Antennas and Towers

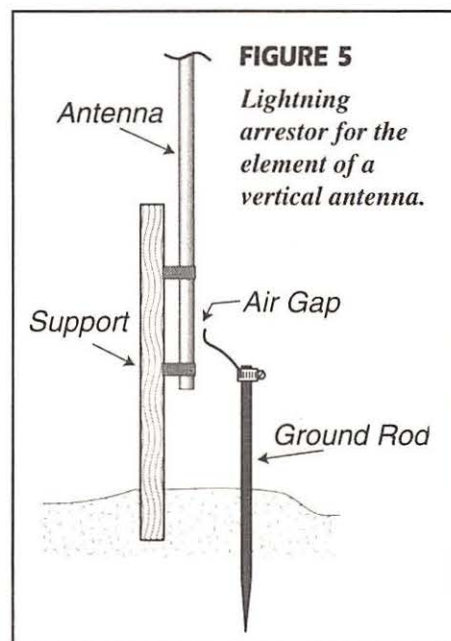
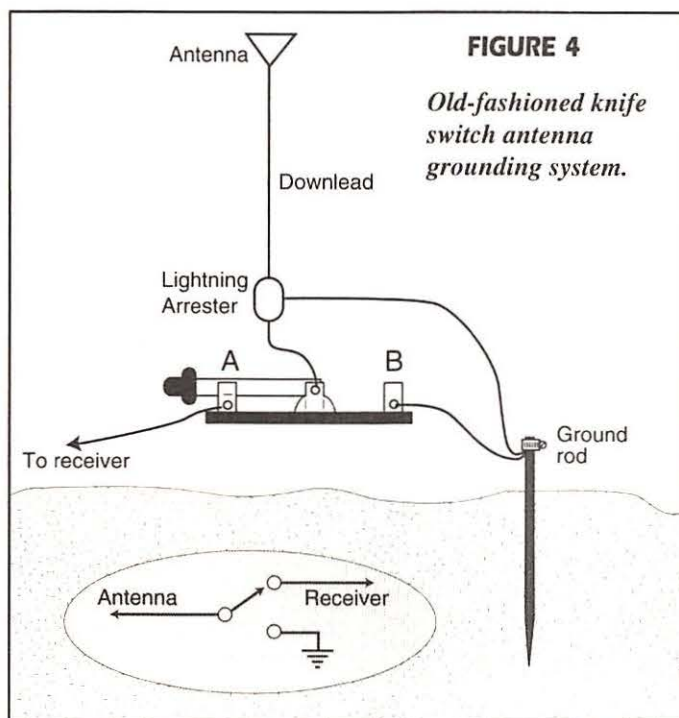
The ground systems shown so far are used for horizontal wire antennas, and others. The transmission line or download lightning arrester can be used for any type of antenna, and indeed should always be used. Vertical antennas can be additionally protected, however.

Figure 5 shows a method for providing a subsidiary lightning arrester for vertical antennas. A stiff heavy duty wire, or strip of sheet copper, is placed in close proximity

(1/4 to 1/2 inch) to the base of the antenna, forming a spark gap for a lightning arrester. This "arrester" is connected to the ground rod via heavy wire. This system can be used on either ground-mounted or mast-mounted vertical antennas. In fact, many commercial vertical antennas have some similar system in place.

Another method is shown in Fig. 6. This method provides both an RF ground and a lightning protection ground. On vertical antennas, the outer shield of the coaxial cable transmission line forms the ground connection to the receiver. This shield should be grounded via heavy wire to an 8-foot copperclad ground rod that is legal under local codes.

A secondary ground in Fig. 6 is the quarter wavelength ( $\lambda/4$ ) radial; this is an RF ground. Radials are #14 or #12 (or larger) wire, cut to a quarter wavelength at a frequency in the center of the band of interest. Of course, for a wide frequency band, such as the high frequency shortwave bands, proper operation requires a multiple radial system for different frequencies a couple of megahertz (MHz) apart. A general rule is to use at least two radials on each frequency, but the real situation is: *the more the merrier*. AM broadcast stations install upwards of 120 radials for a single frequency, but the engineering litera-



ture shows decreasing effectiveness above 15 or 16 per frequency. For most SWL purposes, two radials will work well.

The physical length of radials is found from:

$$L_{\text{feet}} = \frac{246}{F_{\text{MHz}}}$$

Where: L is the length of the radial in feet, and F is the frequency of resonance in megahertz.

### Example

What is the length of a radial cut for a frequency of 9750 kHz (i.e. 9.75 MHz)?

$$L_{\text{feet}} = \frac{246}{F_{\text{MHz}}} = \frac{246}{9.75} = 25.23 \text{ feet}$$

Radials can be installed either above ground, or buried underground a few inches. For the sake of safety, keep the above-ground radials for mast-mounted verticals only ...bury all others (you don't want anyone tripping over the radial that is installed only a few centimeters above the ground, or buried in the grass).

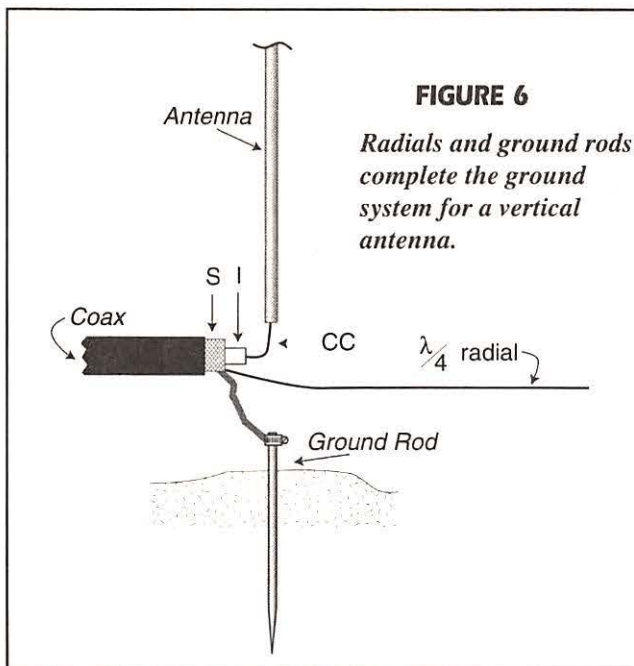
If you are lucky enough to have a tower system for your antenna, then you might want to use a ground system such as Fig. 7. In this case, there are two or more 8-foot ground rods connected to the base of the metal tower through heavy wire. Your local electrical code will most certainly require at least one such ground rod, but given the height of most towers it is probably a safer bet to use multiple ground rods around the base of the tower.

## Conclusion

For an antenna to work at its optimum peak performance, and yet still provide at

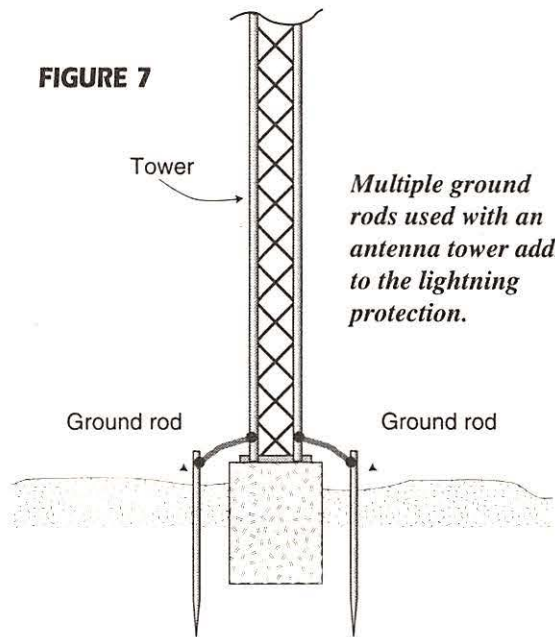
least reasonable protection against lightning strikes and electrical failures in the receiver, a proper ground system is needed. Following these guidelines, you can improve your in-

stallation on all of these points. No form of protection is totally foolproof, or gives absolute protection, but it's better than no protection by a long shot.



**FIGURE 6**

*Radials and ground rods complete the ground system for a vertical antenna.*



**FIGURE 7**

*Multiple ground rods used with an antenna tower adds to the lightning protection.*

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# O CANADA!



## Independent Shortwave Broadcasting in Canada

### Part II

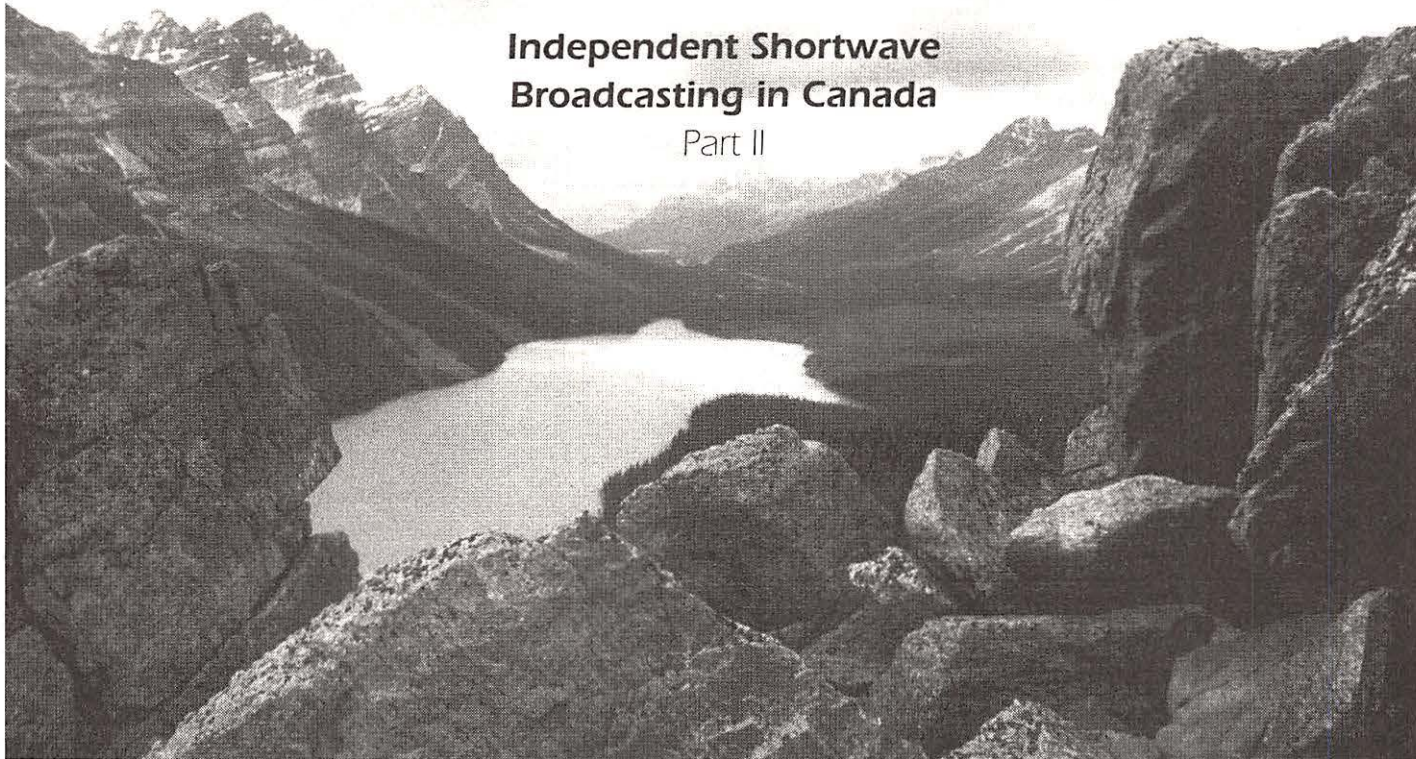


Photo by John Bailey

By Adrian Peterson

In our shortwave broadcast tour through Canada and through time, we have just left Ontario, headed west, to follow the course of those shortwave broadcast stations which remained after the second World War.

#### ■ Manitoba—CJRX

Mediumwave radio station CJRC came onto the air in Winnipeg, Manitoba, in 1928 with 500 watts on 630 kHz. This station was owned by James Richardson & Sons Ltd., grain merchants of Winnipeg, Manitoba, with studios in the Royal Alexandra Hotel.

Soon afterwards and before the end of the decade, a 2 kW shortwave transmitter was installed; thus began what they claimed was the first regular entertainment and information service on shortwave in Canada. The shortwave transmitter was licensed as VE9JR on 11780 kHz and VE9CL on 6150 kHz. Interestingly, as their 1933 QSL

card states, VE9JR was authorized to use the courtesy call letters, CJRX. Thus, the double sets of callsigns were used simultaneously: VE9JR as CJRX, and VE9CL as CJRO.

On October 1, 1943, the callsigns of all three stations were changed from the CJ series to the CK series. Thus mediumwave CJRC became CKRC, and the two shortwave outlets, CJRO and CJRX, became CKRO and CKRX.

With an old and ailing transmitter, CKRO/CKRX left the air in 1949. Station management issued a statement soon afterwards indicating that the shortwave service would return to the air early in 1950. That never happened.

#### ■ Alberta—VED

For a period of some eight years beginning in mid-1949, the communication transmitter VED, operated by the Canadian Army in Edmonton, Alberta, was used for a relay of CBC programs to isolated settlements in the North West Territories and the Yukon. The transmitter was a 5 kW Canadian Marconi TH41 fed into a rhombic antenna directed northwest. The first frequency in use was the out-of-band channel 8265 kHz, though this was soon changed to 7320 kHz.

TABLE 1: Manitoba CJRX

Province	City	Year	Date	Call	Watts	kHz	MW	kHz
Manitoba	Winnipeg	1929		VE9JR/CJRX	2000	11780	CJRC	630
				VE9CL/CJRO	2000	6150	CJRC	630
		1943	Oct 1	CKRX	2000	11720	CKRC	630
				CKRO	2000	6150	CKRC	630

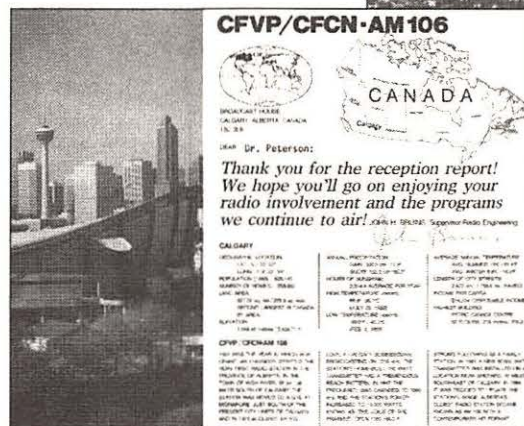
■ **Alberta—VE9AI**

In 1954, station VE9AI was temporarily consolidated with radio VED, the Army/CBC station. Then, in mid 1957, the power output

was increased to 200 watts. The station disappeared two years later.

### ■ Alberta—CFVP

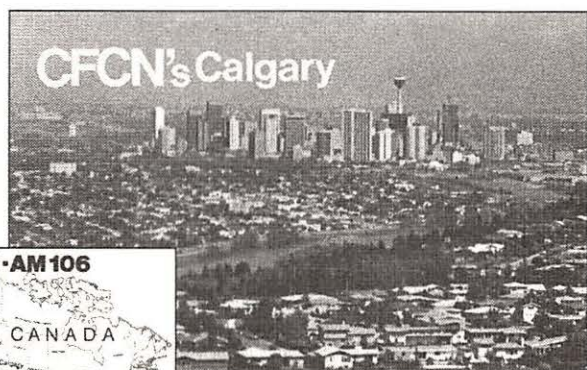
Back in the year 1931, another shortwave transmitter in



Alberta came onto the air from a location at Midnapore, near Calgary. It was a small 100 watt unit on 6030 kHz under the callsign VE9CA. At times, this transmitter was tuned to other channels for which subsidiary callsigns were issued, such as VE9CG (6110 kHz) and VE9CU (6005 kHz).

The transmitter was off the air for a while in 1934 and when it returned later that year, the use of subsidiary callsigns was dropped, as were the other channels. Thus, it was now just VE9CA on 6030 kHz.

Scheduling in those days was rather brief. The station was on the air for seventeen hours on Fridays and twelve hours on Sundays, with



*CFVP/CFCN "Voice of the Prairies" family image has now been updated to a contemporary hit format.*

irregular scheduling in between. Programming was always a tandem relay from the parent pioneer station in Calgary, CFCN, which was erected in 1921 just a few months after the famous KDKA was launched.

The purpose of this small Canadian station was to fill in blank areas not covered by the mediumwave transmitter. The now-nostalgic slogan for this station was "The Voice of the Prairies." The experimental callsign VE9CA gave way to the regularized callsign CFVP about the time of the outbreak of World War 2.

In 1949 both the MW and SW transmitters were relocated to a new site in Midnapore, a few miles south of Calgary. Then, in the spring of 1982 came another move, this time to a totally new location seven and one-half miles southeast of Calgary. A new 100 watt solid state transmitter was installed for the shortwave service, co-sited with the mediumwave facility. The antenna is a 41 foot high quarter wave radiator.

It appears a callsign change may recently have been implemented for the mediumwave counterpart of CFVP, as it is listed in the 1995 edition of *Passport to World Band Radio* not as CFCN, but as CKMX.

**British Columbia—CKFX**

Back in 1931, a small shortwave transmitter appeared on the air in Vancouver, British Columbia. This station was licensed as VE9CS and radiated just 10 watts on 6070 kHz. At the time, it was owned and operated by the United Church of Canada and it relayed the programming of a local mediumwave station, CKFC—a 50 watt station on 730 kHz, also owned and operated by the United Church of Canada. The address in Vancouver at this stage was at the corner of Hemlock and 12th.

**TABLE 2: Alberta VED**

<u>Province</u>	<u>City</u>	<u>Years</u>	<u>Call</u>	<u>Watts</u>	<u>kHz</u>	<u>kHz</u>	<u>MW</u>	<u>kHz</u>
Alberta	Edmonton	Mid 1949-1956	VED	5000	8265	7320	CBX	1010

**TABLE 3: Alberta VE2AI**

<u>Province</u>	<u>City</u>	<u>Years</u>	<u>Call</u>	<u>Watts</u>	<u>kHz</u>		<u>MW</u>	<u>kHz</u>
Alberta	Edmonton	1945-1959	VE9AI	100	6005	9540	CJCA	930

**TABLE 4: Alberta CFVP**

<u>Province</u>	<u>City</u>	<u>Year</u>	<u>Date</u>	<u>Call</u>	<u>Watts</u>	<u>kHz</u>	<u>MW</u>	<u>kHz</u>
Alberta	Midnapore-1	1931		VE9CA	100	6030	CFCN	985
				VE9CG	100	6110		
				VE9CU	100	6005		
		1934	VE9CA	100	6005	CFCN	1030	
		1939		CFVP	100	6030	CFCN	1010
	Midnapore-2	1949		CFVP	100	6030	CFCN	1060
	Calgary	1982	Spring	CFCP	100	6030	CFCN	1060
		1994		CFVP	100	6030	CFCN	1060

# SUPER COUNTRY CKFX

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CKFX/CKWX  
Shortwave CKFX is  
undergoing  
construction of a  
new transmitter,  
but its low priority  
has kept it off the  
air for two years.

In the mid-1930's, the MW station changed channels to 1410 kHz, and at about the same time, the church divested itself of the small shortwave outlet, which was taken over by Radio Service Engineers Ltd. at 734 Davie St., Vancouver. A year or two later, VE9CS was taken over again—this time by Standard Broadcasting System in the Stock Exchange Building—though programming was still a relay from the church-owned mediumwave station, CKFC.

In the earlier part of 1939, shortwave VE9CS began to relay the programming from mediumwave CKWX, which was owned by Western Broadcasting. Soon after the mid-year, the callsign of the shortwave unit was changed to CKFX.

The transmitter, license and callsign were taken over by CKWX, and a construction permit was granted in 1939 for shortwave CKFX to co-locate with the mediumwave facility CKWX. The 10 watt transmitter was rebuilt, using new parts and probably some of the older parts from the original VE9CS as

well. It was returned to the air in 1940. The signal was fed into a two-element directional array.

This revived shortwave service was implemented to fill in for shadow areas of the mediumwave CKWX, particularly in the rugged localities of the Queen Charlotte Islands and Vancouver Island. Because of the mountainous terrain, the low-powered shortwave signal could penetrate into areas where the higher-powered mediumwave station could not be heard. In addition, many of the communication receivers in use at the time at fishing and logging camps were capable of receiving the 49 meter band, but not the standard mediumwave band.

In the spring of 1980, when the mediumwave facility was relocated on Lulu

Island, the small shortwave transmitter was also moved, and the signal was fed into a new antenna—a simple untuned vertical with thirty ground radials as a counterpoise.

In 1992, the transmitter was no longer functional and it was removed from service. This original unit was more than fifty years old and it had been modified on many occasions to accommodate the spare parts available. Since that time, station engineers have been constructing a new transmitter, but, because the shortwave service is not a high priority, the project is not yet completed. When the shortwave unit, CKFX does return to the air, it is probable that the power output will still be a mere 10 watts.

## ■ British Columbia—CKZU

It was back in 1946 that CBRX in Vancouver, British Columbia, first came on the air with an RCA 150 watt transmitter radiating through a rhombic antenna on 6160 kHz. The mediumwave parent station was the CBC outlet, CBR, on 1130 kHz.

The primary purpose for this station was as a relay link to provide CBC programming to an isolated LPRT (low power relay transmitter) located at Ocean Falls, on the west coast of British Columbia. However, when the British Columbia Telephone Company provided a telephone line for the program relay, the shortwave service was retained in order to serve scattered northern areas of the province.

In 1954, a new Marconi transmitter with a power output of 500 watts was installed. The new antenna system was also a rhombic at 25 degrees, with four tower 50 feet high, and each leg 240 feet long. The transmitter base was located on Lulu Island, twelve miles south of Vancouver, and the studios in downtown Vancouver.

In 1965 the callsign was changed from CBUX to CKZU with the last letter now signifying the mediumwave station CBU.

The power output of this shortwave station was increased to 1 kW in January 1983, when a new antenna system was installed—a dipole with reflector.

## ■ Projected New Stations

- In 1958, a 50 kW shortwave transmitter was under consideration for Vancouver for coverage of northern areas as a replacement

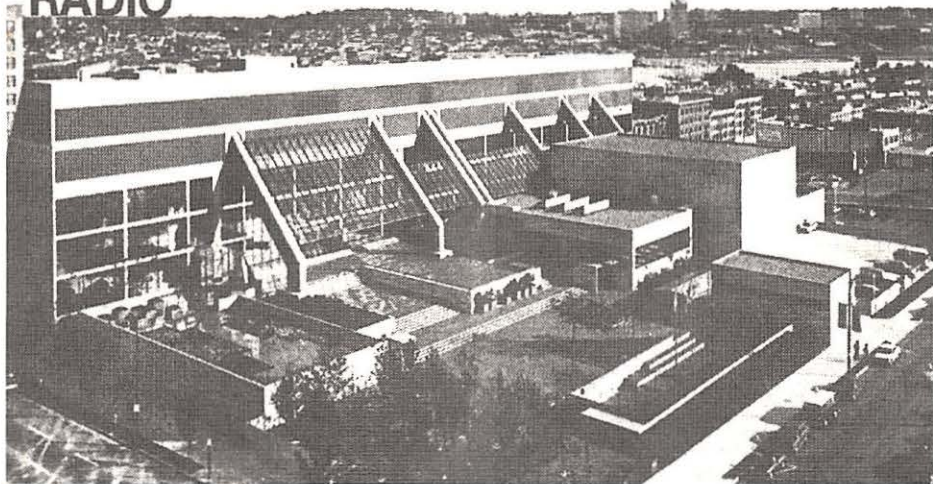
TABLE 5: British Columbia CKFX

Province	City	Year	Call	Watts	kHz	MW	kHz
British Columbia	Vancouver	1931	VE9CS	10	6070	CKFC	730
	Lulu Is	1939	CKFX	10	6070	CKWX	980
	Lulu Is	1980	CKFX	10	6070	CKWX	1130
		1994	CKFX	10	6070	CKWX	1130

TABLE 6: British Columbia CKZU

Province	City	Year	Call	Watts	kHz	MW	kHz
British Columbia	Vancouver	1946	CBRX	150	6160	CBR	1130
		1953	CBUX	150	6160	CBU	690
		1954	CBUX	500	6160	CBU	690
		1965	CKZU	500	6160	CBU	690
		1983	CKZU	1000	6160	CBU	690
		1994	CKZU	1000	6160	CBU	690

# CBC RADIO



*Station CKZU provides CBC programming to the Pacific and northern reaches of the province of British Columbia.*

to CBUX. This project was intended to be completed in 1960, but it was never implemented.

In 1979, a proposal was under study for the implementation of a new broadcasting system for northern areas in the 4 MHz band. This project was abandoned for three reasons:

1. Too costly to implement.
2. Insufficient receivers with 4 MHz tuning range.
3. Newly developing satellite technology seemed a better alternative.

In 1991, the newly organized North American Broadcasting Company announced that they planned on establishing an international shortwave station to serve as a relay base for overseas broadcasters. The station was to be located at Morden, eighty miles southwest of Winnipeg, for coverage into the United States and other countries in the Americas. It was planned that the station would accommodate two shortwave transmitters at 250 kW, each of which would be rented out at a fee of \$1,000 per hour.

In 1993, Radio for Peace International in Oregon and Costa Rica announced that they

would establish a shortwave station at Salmon Arm in British Columbia. Originally it was announced that this would be a 10 kW facility and that it was expected to be on the air by the end of 1993. Recent reports indicate that the property has been bought and that a 50 kW MW transmitter will be installed and converted for shortwave usage.

- At least two local stations in Canada have given consideration in recent years to establishing a shortwave unit as a relay of local programming for a wider area.

## ■ QSLs

Each of the exotic little shortwave stations in Canada has issued QSL letters and cards verifying accurate reception reports. These stations have been heard in all continents worldwide when propagation conditions are good. It looks as though the Canadian radio scene is still undergoing change. Why not QSL what you can while you can?

**TABLE 7: Current Status**

At the present time, there is a total of seven little shortwave stations on the air in Canada.

Province	City	Call	kHz	Watts	MW	kHz	Owner	Status
Newfoundland	St. John's	CKZN	6160	1000	CBN	640	CBC	Active
Nova Scotia	Halifax	CHNX	6130	500	CHNS	960	Commercial	Active
Ontario	Toronto	CFRX	6070	1000	CFRB	1010	Commercial	Active
Quebec	Montreal	CFCX	6005	500	CIQC	600	Commercial	Irregular
Alberta	Calgary	CFVP	6030	100	CFCN	1060	Commercial	Active
British Columbia	Vancouver	CKFX	6080	10	CKWX	1130	Commercial	Inactive
British Columbia	Vancouver	CKZU	6160	500	CBU	690	CBC	Inactive

**TABLE 8: Callsign Changes**

Call	Year	Subsidiary Calls	Change	Year	Change	Year	Change	Year
CBFW	1946	CBFR CBFX CBFO	No changes, closed	1956				
		CFY CBFL CBFA CBFZ						
CBUX	1946		No changes, closed	1956				
CBRX	1946		CBUX	1953	CKZU	1965		
CFRX	1937		No changes					
CJCX	1938		No changes, closed	1976				
VE9AI	1945		No changes, closed	1959				
VE9CA	1931	VE9CG BE9CU	CFVP	1939				
VE9CF	1929		CHNX	1936				
VE9CL	1929		CJRO	1931	CKRO	1943	Closed	1949
VE9CS	1931		CKFX	1939				
VE9HX	1935	VE9HK	CHNX	1936				
VE9JR	1929		CJRX	1931	CKRX	1943	Closed	1949
VED	1949		No changes, closed	1956				
VONH	1939	VONG	CBNX	1949	CKZN	1965		
VONW	1950		CKA36	1954	Disappeared	1954		
XWA	1919		VE9DR & VE9DN	1930s	CFCX	1936	CIQX	1991
							CFCX	1992

Looking for more enjoyment in scanning?

# Try Searching!

By Ed Hesse, WB2RVA

If your scanner could talk, it would probably say "search me." The *search* feature in a scanner is one of the least-used—and most valuable—functions it contains. This ability to search a defined range of frequencies can lead you into a whole new world of monitoring enjoyment.

Too many times we get carried away by the number of *scanning* channels a unit con-

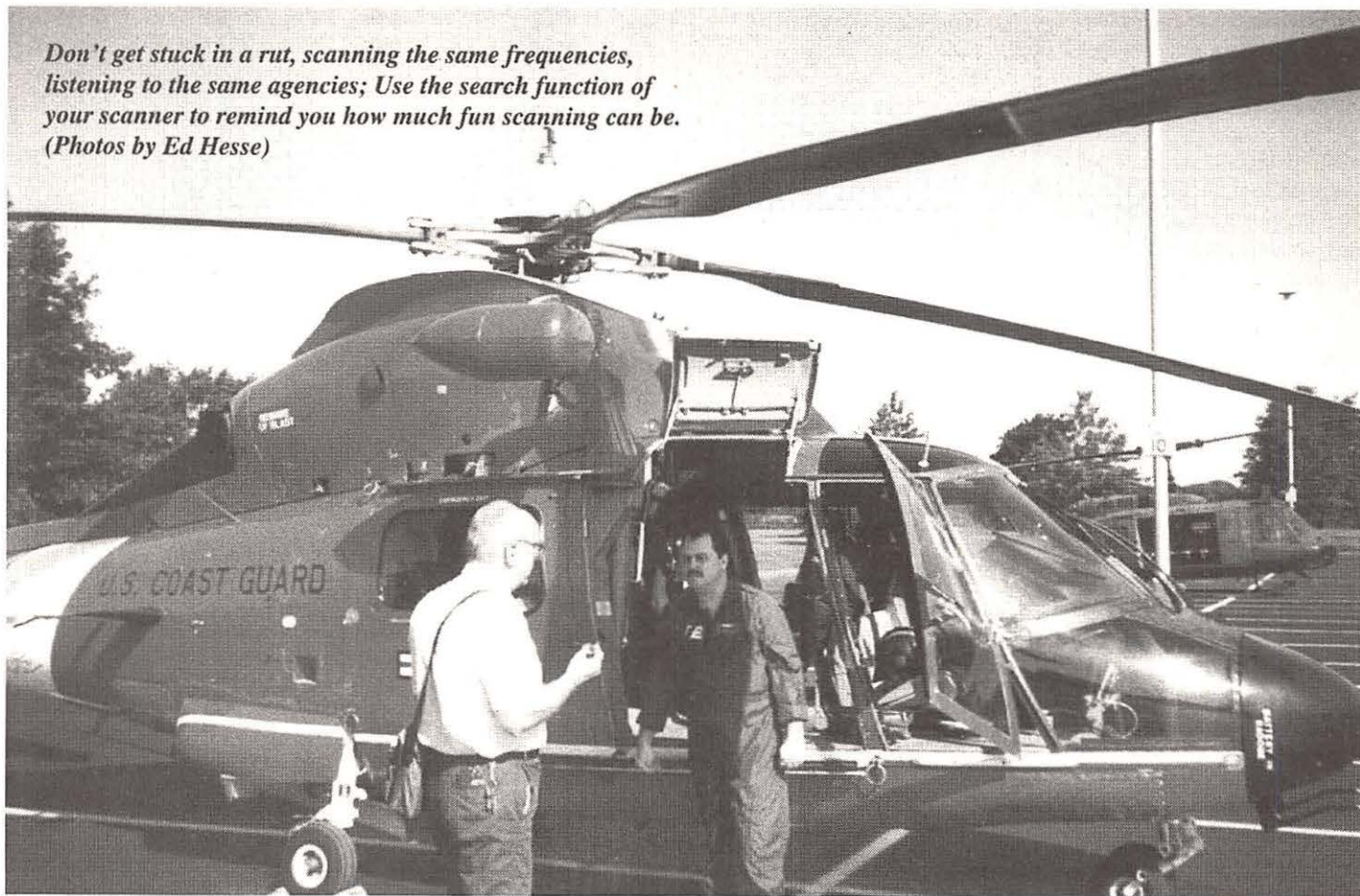
tains. One thousand channels in 10 banks—WOW! We're then faced with the task of not only finding, but programming into the scanner 1,000 frequencies. And, after all that, we find we've inadvertently closed the door to monitoring the interesting action which is taking place on frequencies *other* than those we've programmed.

If you think there's more to scanning than listening to the same 30, 40, or 50 frequencies day after day, here are some good ways

to get back into the *real* fun of monitoring:

1. *Get a scanner which has a search function.* Most scanners do. And some will offer you a number of "search banks," that is, you'll be able to search through different ranges without having to reprogram each time you change ranges. For example, you can search through the amateur radio two meter banks (144 - 148 MHz), and then by pushing another button, you can search through railroad frequencies (160.215 -

*Don't get stuck in a rut, scanning the same frequencies, listening to the same agencies; Use the search function of your scanner to remind you how much fun scanning can be.*  
(Photos by Ed Hesse)



161.565). Some scanners (like the PRO-2004) give you 10 search banks—enough to satisfy the curiosity of most scanner enthusiasts.

2. *Learn how to use the search function.* With most rigs, this is pretty easy to do. Read the instructions and practice a few times, until searching becomes second nature. Unless you are comfortable with the use of the search function, you'll find yourself avoiding searching and "going back" to scanning.

3. *Ask yourself in what areas of monitoring you'd like to become proficient.* The attraction of searching is that you don't have to know any specific frequencies! All you have to know is the portion of the radio spectrum where your targets can be found. As mentioned above, most railroad transmissions can be found between 160.215 and 161.565. If you want to listen to the local railroad, set your scanner to search between those two frequencies.

And it will! It will go around and around, searching for a transmission. As soon as someone starts to talk on the air, you'll hear the conversation. When they finish, the scanner starts its search again until someone else starts to talk. Table 1 will get you started on your searching activity. It lists many of the frequency ranges covered by the search function of most scanners.

4. *Get a good antenna for your scanner.* Many of the transmission you want to hear while searching are not going to be block-buster signals. Get an outdoor antenna, mounted as high as you can get it. If that's not feasible, use an amplified indoor antenna, and set your scanner's squelch as "loose" as you can.

5. *Don't search large areas of the spectrum at one time.* For example, if your scanner has 800 MHz coverage and you want to find out what's "up there," it's wise not to search too huge a swath—say, 50 MHz—at one time. Start by choosing small sections.

For example, 810-816 MHz is dedicated to Public Safety. Instead of searching through six megs of spectrum, try searching from 810 to 811. If monitoring this produces nothing, shift to searching 811 to 812, and so on. If consistent monitoring of an area produces nothing, move on to more fruitful areas. However, if you secure some interesting "hits," you can continue to search as you build your list of interesting frequencies.

6. *Keep a log of what you hear.* Write down the frequency, the contents of the transmission, the date and time of day, and any other details (unit numbers, codes being used, etc.). You can eventually move "hot" freqs to the scanning side of your radio to monitor on a daily basis.

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7. *Use a voice-activated tape recorder.* You can't sit by your scanner hour after hour, day after day. Every now and then you have to leave the house, go to work, go shopping, whatever. If you'd like to search a frequency range in your absence, put a voice-activated tape-recorder next to the scanner. When you return, check the tape. If it hasn't moved, that's one indication of the "traffic" in that range. If the tape contains several transmissions, you have something to review in order to determine what's taking place.

8. *Be prepared to become hooked on searching.* Anybody can scan, but the real pros search consistently. A few weeks ago, your author bought what he thought was another scanner: the Bearcat BC 350A. Actually, it's a *searcher*. You take it out of the box, plug it into the wall outlet, and you're ready to go. You don't need any frequency reference books.

Do you want to listen to hams on two meters? Just push the "band" button until 144 - 148 appears on the screen. Then push "search," and off it goes. I have heard more ham radio repeaters since I bought the rig than I did in the many years when I just programmed in frequencies of my "favorite" repeaters. How dull that was! How great it is to hear everything that's out there! I can do the same type of searching with many other bands. (If I get bored of searching, I can push other buttons on the 350A which will bring up *pre-programmed* frequencies in areas like Police, Fire/Emergency, and so forth.)

Yes, it's nice to have "favorite" frequencies, and it's handy to have reference books to tell you where to look for specific services. But if you want the real excitement of monitoring, search for it!

**TABLE 1**

**VHF/UHF Search Areas of Interest**

45.1 - 45.6	Local Government, Police
46.1 - 46.55	Fire, Local Government, Police
118.0 - 121.4	Air Traffic Control
121.5 - 123.45	Miscellaneous Aero
121.6 - 121.925	Air Traffic Control (Ground Traffic Control)
121.975 - 122.675	FAA Flight Service Stations
123.175 - 123.575	Flight Test - Manufacturers
123.3 - 123.5	Flight Schools Instructions
132.025 - 135.975	Air Traffic Control beyond 30 miles of airport
138.0 - 144.0	Military Aircraft VHF
148.0 - 150.8	US Military fixed/mobile
148.290 - 150.75	US Navy
150.815 - 150.965	Auto Towing/Auto Clubs
151.625 - 151.955	Business
152.27 - 152.465	Taxis Base/Industrial
156.25 - 161.975	Marine
158.91 - 161.61	Railroads
406.0 - 420.0	US Government
420.0 - 450.0	Amateur Radio
450.0 - 470.0	Business Band, PD, Fire, Radio, TV Remotes
450.0 - 452.0	Broadcast, Remote pick-up
452.9625 - 453.0 -	Newspapers, News Reporters
453.0125 - 453.9875	Police, Local Government
462.55 - 462.725	GMRS
472.4675 - 472.7875	Railroad, Motor Carrier
816.0 - 821.0	Business Bands, Trunked systems Mobile input
821.0125 - 823.9875	Public Safety
851.0 - 855.0	Business band conventional systems, Base output
861.0 - 866.0	Business band, Trunked systems, Base output
866.0125 - 868.9875	Public Safety
902.0 - 928.0	Cordless Phones



# Hooked on Scanning

The year was 1975 and I was a certified 16-year-old scanner freak. I was the proud owner of one of Bearcat's first scanners, the Bearcat III. It had only eight crystal-controlled channels and two bands, but it was state-of-the art at the time (*see this month's feature on scanner collecting!* - ed). I spent hours in my room listening to that scanner and waiting for my next "fix." I felt almost addicted to the exciting new world that my scanner opened up for me.

Although I lived in a relatively quiet Massachusetts community at the time, I was still able to hear plenty of action by monitoring the state police as well as some of the cities down around the Boston area. Most of the time the action was many miles away, and I often wondered what it would be like to have the state police helicopter flying overhead searching the woods behind my house for armed robbers or desperate prison escapees. Sure, scanning was a lot of fun, but I couldn't help wondering what it would be like to actually be there on the scene.

One spring day I got a little taste of what it was like to have some of the action taking place right in my own neighborhood. It started pretty much like a typical rainy spring day in New England. I was hanging out in my room listening to my scanner as the rest of the family pursued other interests elsewhere in the house.

A call on the local police frequency grabbed my attention immediately and I hit the SCAN/MANUAL button on the old Bearcat to lock it onto that channel. Police units were being dispatched to a convenience store that had just been held up. We didn't have a lot of armed robberies in town so this was definitely a major incident. Especially since this particular convenience store was just down the street from my house! We used to walk there to buy candy.

The description of the suspects was a bit sketchy. There were four or five of them and they were all 17 or 18 years of age. Strangely enough, the weapon used to threaten the store clerk was some kind of walking cane. I suppose four or five young punks threatening to

beat you up is probably reason enough to feel threatened, even if they aren't waving a walking cane in your face! The police certainly seemed to be treating the incident seriously. It sounded as if they had every cop in town on the way to the scene of the crime!

I called downstairs to the rest of the family to tell them what had happened and soon they were all upstairs in my room glued to the scanner.

That was pretty typical. They were famous for showing up to listen to the scanner only when something interesting was happening. The same people that were always telling me to turn my scanner down were now up in my room telling me to be quiet so they could hear the scanner! I'm willing to wager that a lot of other monitoring enthusiasts can relate to that!

Living so close to the store, I knew I should keep watch in case the "bad guys" came my way. I turned up the scanner and kept a vigil at the window, watching the street like a hawk. Suddenly a blue car came speeding down the street. They came to a screeching halt when they realized that the road dead ended right beside our house. These guys were obviously in a big hurry. I watched them as they turned the car around and could see that it was a car full of teenage guys. Our street was always very quiet, and we didn't often have carloads of kids doing bat turns at the end of the street. This had to be the car the cops were looking for!

I was on the phone to the police department in a matter of seconds. It was kind of exciting to hear the dispatcher transmitting the information out over the air as I gave it to him. Since there were a couple of ways out of our neighborhood, the cops sent one cruiser in each way in an effort to box them in. As the first car into the area reported no contact with the suspects, the other car came on the air with an air of excitement in his voice.

"They just passed me going the other way," he said. "They're not stopping, they're

gunning it," he reported. The chase was on and the officer reported his position, siren sounding in the background.

Other police vehicles joined the chase as the young suspects attempted to make good their escape, but apparently the old blue Comet wasn't up to the task. The chase ended when the suspects decided to pull over and call it quits. They were quickly apprehended a short distance from my house, and it was soon discovered that at least two of the suspects had outstanding arrest warrants in addition to being suspects in the robbery.

It was exciting to be involved in an incident like that and I felt good about helping the police apprehend the suspects. I wondered that made them think that they could get away with it. "That'll teach them to come down into our neighborhood and pull a stunt like that," I thought to myself. Chalk up another one for the good guys.

Soon the scanner fell back into its quiet routine of reports on broken down cars and kids drinking beer behind the shopping mall. I knew it was just a matter of time before my hours of scanning would pay off again with another big scoop. "What will it be next time?" I wondered. A homicide? A big fire? A kidnapping?

My daydream was soon rudely intruded upon by a booming voice directed at me. "Turn that thing down!" my father hollered up the stairs.

By Randy Locke



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# Operation Secure

2813.4 LSB (not USB- 2812.0) 0800Z. DPS Victoria working DPS Corpus Christi. Mostly radio checks and what might have been a conversation about a hospital.

**B**ecause I was born and raised in Texas, the above logging caught my attention when it was posted on the Grove BBS by Jeff Haverlah for Brian Scott in White Settlement, Texas. In case you don't recognize the acronym, 'DPS' stands for Department of Public Safety (in other words, the Texas Highway Patrol).

Initially, I wondered what Texas DPS was doing in the shortwave spectrum. I have never seen them reported on HF before. The answer became quite clear once the frequency was cross-checked in my HF database: it is called Operation Secure.

SECURE is an acronym for "State Emergency Capability Using Radio Effectively." The system is an outgrowth of the old Disaster Communications Service, formerly governed by FCC Part 99.

On January 16, 1980, the FCC adopted a Notice of Proposed Rule Making (NPRM) which addressed the need for medium and long-range communications between disaster sites and command centers. The intent of the adoption of the NPRM was to provide frequency capability which would allow reliable coverage no matter what the distance. The result of this was the development of Operation Secure—governed under Part 90—and the deletion of Part 99.

To provide the required coverage, the FCC decided to use frequencies between 2 and 10 MHz instead of the 1750 to 1800 kHz range used by the old Disaster Communications Service.

Initially, the FCC proposed to assign dedicated frequencies to applicants to use for disaster communications. It soon became apparent that this would not work, due to the potential for interference. The current practice is for the state agency applicants to specify which bands and how many channels on each are needed. The FCC then assigns those which are least likely to cause interference from the available frequencies.

As originally developed, the assigned frequencies could only be used for emergency communications and short periods of testing and training, not to exceed one hour per week. This rule has been amended to allow testing or handling of administrative traffic for periods of up to seven hours a week or one hour per day. During a declared emergency, the Secure system may be used for extended periods during the duration of the emergency.

According to an FCC official, all the states have now been licensed for Secure operation, but not all states have equipment at this point. The current FCC database tells a different story, however. It indicates that only 33 states and Puerto Rico have listings on Operation Secure frequencies. The following 17 states **do not** have listings in the current FCC master file on any of the Operation Secure frequencies: Alabama, Alaska, Arizona, Arkansas, Delaware, Georgia, Hawaii, Illinois, Iowa, Kansas, Kentucky, Maryland, Minnesota, Oregon, South Dakota, Tennessee, West Virginia, and Wisconsin.

Table 1 lists all the Operation Secure frequencies and the states in the FCC database that have been licensed to use them.

TABLE 1

### Operation Secure Frequencies and Licensed States

2326.0	All currently licensed states except New Mexico, Oklahoma, and Puerto Rico.
2411.0	MA-MO-NJ-NC-RI-VA-VT-WA
2414.0	ID-MA-ME-MI-MO-NH-WA-WY
2419.0	CA-CT-MA-MO-OH-RI-TX-VT-WY
2422.0	CA-OH-SC-TX
2439.0	FL-MO-PR
2463.0	FL-MO-VA
2466.0	CO-ND
2471.0	CO-ID-ND-PA
2474.0	CO-ND
2487.0	IN-NV
2511.0	IN-NV-SC-VA
2535.0	ID-MS-UT
2569.0	MS-UT
2587.0	ND-NJ-TX-VA-WA
2801.0	NM-OK-TX-UT-VA-WA
2804.0	CA-ID-MI-MT-NE-NM-OK-TX-UT
2812.0	CA-LA-MT-NE-NY-ND-TX-VA
5135.0	AK-CO-CT-ID-IN-MA-ME-NC-NH-NM-NY-OK-PA-RI-SC-UT-VT
5140.0	CA-FL-ID-IN-MI-MO-NM-OH-OK-PR-TX-UT-VA
5192.0	CA-CT-MA-ME-MO-NE-NH-RI-TX-VA-VT-WA
5195.0	AK-CA-ID-MS-NV-NJ-ND-PA-TX-UT-VA-WY
7477.0	CT-ID-LA-MA-MI-MO-MS-MT-NC-NM-NY-OK-RI-UT-VT
7480.0	AK-CA-LA-MT-ND-NM-NV-OK-SC-UT
7802.0	CA-CO-IN-MO-OH-TX
7805.0	All currently licensed states except New York, North Carolina, Puerto Rico, and South Carolina.
7932.0	FL-ID-NV-PA-PR-SC-TX-WY
7935.0	IN-MO-NC-NE-TX-WA

In addition to the Texas DPS, some other agencies I have heard on Operation Secure frequencies include: Federal Emergency Management Agency (FEMA), Florida Department of Law Enforcement (FDLE), Florida Department of Emergency Services, plus various state agencies in Mississippi and California. These frequencies definitely bear watching during emergencies and should provide utility listeners with some interesting traffic during statewide drills and disasters.

For the benefit of our Texas readers, Table 2 lists the Operation Secure frequencies that the State of Texas (Department of Public Safety) is licensed to use, plus the stations (located at DPS sites) and calls that are licensed on them.

Ute World regular Jack Metcalfe had this to add after seeing Jeff Haverlah's posting, which opened this column, on the Grove BBS:

"Over the last few years, I've run into two state/regional networks that are operational on a fairly regular basis. One of the nets is operated by the Florida Division of Emergency Management and the other by Oklahoma's Disaster Agency.

"The Florida net used to be heard daily in 45 baud RTTY on 7933.3 kHz around 1500 UTC. I haven't heard them recently, but I'm not able to listen during daylight hours as much as I used to. I do remember hearing the Florida net during Hurricane Andrew on 7932.0 USB.

"The Oklahoma net has been very active in the past on 7477.0 kHz

TABLE 2

## Texas Operation Secure Frequencies and Stations

Frequencies (kHz):

2326.0	2801.0	5135.0	7805.0
2419.0	2804.0	5192.0	7932.0
2422.0	2812.0	5195.0	7935.0
2587.0		7802.0	

Call	Station	Call	Station
KB39419	Mobiles Statewide	WPAH467	Waco
KNGR741	Austin (DPS Headquarters)	WPAH468	Brownwood
WPAH450	Corpus Christi	WPAH469	Bryan
WPAH451	Kerrville	WPAH470	Wichita Falls
WPAH452	Sulphur Springs	WPAH471	Victoria
WPAH453	Texas City	WPAH472	Garland
WPAH454	Sherman	WPAH473	Abilene
WPAH455	Lufkin	WPAH474	Texarkana
WPAH456	Beaumont	WPAH475	San Antonio
WPAH458	Childress	WPAH476	El Campo
WPAH459	Del Rio	WPAH477	Pecos
WPAH460	Austin	WPAH478	Lubbock
WPAH461	El Paso	WPAH479	McAllen
WPAH462	Laredo	WPAH480	Midland
WPAH463	Amarillo	WPAH481	Hurst
WPAH464	Mineral Wells	WPAH482	San Angelo
WPAH465	Tyler	WPAH483	Lampasas
WPAH466	Houston	WPAH484	Harlingen

USB. In addition to Oklahoma stations, a New Mexico station checks in, as well as a FEMA station. The last time I heard this net, they were discussing a possible move to 5195.0 kHz."

A thousand Ute World thanks to Jack, Jeff, and Brian for updating us on these important HF radio networks. I hope to feature more Secure state systems and stations in future Utility World columns as space and information becomes available.

If you have any information on your state's Operation Secure system, we would like to hear from you. You can write us at the Brasstown address, post message traffic in conference 10 on the Grove BBS, or send it to us at our Internet e-mail address: grove@mercury.interpath.net.

So remember, next time a natural disaster threatens or strikes the U.S., don't just punch in the FEMA HF frequencies; give Operation Secure a try.

### What are EAMs?

Several issues ago (Dec 94) we talked about the U.S. military's Emergency Action Message (EAM) broadcast. Here is an interesting explanation, taken from a U.S. Air Force manual, of what an EAM is.

"Joint Chiefs of Staff Emergency Action Messages (EAMs) contain key instructions or information from high level authority and have predetermined formats (pro forma). Such messages are transmitted by various communications systems and normally carry FLASH precedence. They are vital messages of an extremely time-sensitive nature, and rapid processing is mandatory to obtain the fast reaction required by their content. Usage and handling procedures are of the highest classification and have been issued by the JCS only to those who have a need to know." (AFM-01-1-18, sub 3; amended 01 Jan 1990)

Next time you hear one of these messages on the Global HF System (GHFS), take a second and think about the above description as you monitor the message.

### Ute World Pot Luck

• Paul Greenwood passes on the following information based on logs that have appeared in this column. What sounded like **Mary 2 and 3** callsigns, as listed in the Ute Log section, are really AMIRI 2 and 3. Their aircraft aren't British Airways as the reporter indicated, but Royal Flights operated by the Government of Qatar. The planes are:

AMIRI 1 and 3	Boeing 707
AMIRI 2	Boeing 727
AMIRI 4 and 5	Falcon 900

• **5680 kHz UK logs** - Watchdog callsigns are normally associated with Ministry of Food and Fisheries (MAFF) aircraft in the UK. The aircraft is a Dornier 228 G-MAFI which can be picked up flying around the UK, and often goes to Bournemouth for servicing on weekends. It looks like the ships of this agency sometimes use the callsign, also. They are Island class patrol vessels (island names) which are listed in *Janes Fighting Ships*.

MAFF ships are normally heard using two-letter callsigns GA-GZ or KA-KZ—which one seems to be chosen at random by MAFF—and other Royal Navy ships, when speaking to Coastal Control in London.

• **5696 kHz UK logs** - This frequency is used as a backup for 5680 by Edinburgh/Plymouth Rescue Centers, when it appears an SAR (Search and Rescue) might become far-reaching or of longer duration, in order to leave 5680 kHz clear for other calls.

The RNAS Culdrose 06F was likely a HAS.6 Sea King helicopter, several of which are based there. Paul says that Culdrose has been noted on the following primary and discrete frequencies: 3885.0, 4140.0, 4775.0, 6825.0

Kenford in the UK has also passed along some Culdrose information. The listed official frequencies for Royal Navy Air Station Culdrose air-to-ground operations are on 3885 and 5696 kHz.

Thank you, gentlemen, for updating us on this UK information.

• Finally, the SC-MAC ute group in the Netherlands has passed along some possible descriptions of some **X-ray codes** commonly being used by NATO and US Navy military units. These codes are normally heard on the Alligator Playground (Link 11) data link and voice coordination frequencies. (Note: Must be listened to in conjunction with the data downlink signal when you have found it.)

XAA	Commencing downlink (Signal is constant tone)
XAB	Awaiting signal (signal changes to usual sound)
XAC	Sending different mode?
XAD	Receiving different mode?
XAE	Awaiting your Alligator/Beaver data
XAF	Sending my Alligator/Beaver data
XAG	Simulcasting HF/UHF
XAI	I am in training configuration
XAJ	1-4 heard. Also figures 3332, 3317. Believe these XAJs are Link 11 frequencies.
XAO	Out of Alligator Playground
XAP	Connected to Alligator Playground
XBH	Transmit minimum power
XBO	Not transmitting Beaver
XBP	Not participating in Alligator Playground
XBV	Transmitting Beaver
XCB	Unit change?
XCC	Cross check
XCJ	Identify track
XDB	Dropping Alligator
XDD	Off station
XWH	Lost sync
XYP	Ready to link into Alligator Playground
XYT	Usual response to XYP
Ping Pong	Data Systems Interrogation

For more information on the US Navy's Alligator Playground, see the January 1994 Utility World column. Now let's see what you have been hearing from the world of utility listening. *BK 73 de Larry SK.*

## Abbreviations used in this column

AM	Amplitude Modulation	MFA	Ministry of Foreign Affairs
ANSA	Agenzia Nazionale Stampa Associata	MHz	Megahertz
ARINC	Aeronautical Radio, Inc	m/v	Motor Vessel
ARQ	Synchronous transmission and automatic repetition teleprinter system	Mystic Star	USAF VIP radio network
ARQ-E3	Single channel ARQ teleprinter system	NAS	Naval Air Station
AWS	Air Weather Service	NASA	National Aeronautics and Space Administration
BRD	Booster Recovery Director	NAVTEX	Navigational, meteorological warnings, and urgent information for ships
COMSTA	Communications Station	NCS	Net Control Station
COMSUBLANT	Commander, Submarine Force-Atlantic	NECN	National Emergency Communications Net
CQ	General call for any station	NORAD	North American Air Defense Command
CTU	Commander Task Unit	Ops	Operations
CW	Continuous Wave (Morse Code)	Reach	Callsign for USAF Air Mobility Command (AMC) aircraft
DEA	Drug Enforcement Administration	R/T	Radioteletype
DSN	Defense Switch Network	RTTY	Radioteletype
EAM	Emergency Action message	SAM	Special Air Mission
ETA	Estimated Time of Arrival	SATCOM	Satellite communications
FEMA	Federal Emergency Management Agency	SCACS	Strategic Command and Control System (Pronounced SACKS)
GEP	Ground Entry Point (station part of Echo/Foxtrot/Wideband system)	SITOR-A	Simplex teleprinting over radio system, mode A
GHFS	Global HF System	SITOR-B	Simplex teleprinting over radio system, mode B
HF	High frequency	SRB	Solid Rocket Boosters
HICOM	High Command (Old US Navy JCS network)	Tanjug	Telegrafska Agencija Nova Jugoslavija
HMCS	Her Majesty Canadian Ship	Twinplex	Four-frequency duplex teleprinting system
ID	Identification	U.S.	United States
IFE	In-flight emergency	USAF	U.S. Air Force
MARS	Military Affiliate Radio System	USB	Upper sideband
Mena	Middle East News Agency	USCG	U.S. Coast Guard
Meteo	Fixed station used for the transmission of meteorological information	USCGC	U.S. Coast Guard Cutter
		VIP	Very Important Person
		Xinhua	New China News Agency

All frequencies in kilohertz (kHz), all times in UTC. All voice transmissions in English unless otherwise noted.

- 518.0 9HD-Valleta Radio, Malta, with SITOR-B NAVTEX navigational warning broadcast at 1820. SDJ-Stockholm Radio, Sweden, with SITOR-B NAVTEX weather information broadcast at 1530. CTV-Lisbon (Monsanto Radio), Portugal, with SITOR-B NAVTEX navigational warnings at 1855. (Guy Denman-UK)
- 2622.0 WRPH-m/v *Liberty Star* (NASA SRB recovery ship) at 0521 in USB working BRD (Booster Recovery Director) regarding status of shuttle launch. (Rich Baker-Austintown, OH)
- 2749.0 Halifax Coast Guard, Canada, with weather broadcast at 2220. (Harry Ferguson-Philadelphia, PA)
- 3033.5 Unidentified station transmitting 5-letter groups in CW at 1024. (Jack Dix-Yonkers, NY)
- 3047.0 Halifax working Sidecar after trying 6694 and 4739 in USB at 0247. (Keegan via Boender and Internet)
- 3067.0 NSNO working UZPH in CW at 2154. (Ary Boender-Netherlands)
- 3134.0 Swedish Navy, Wanda sending message of 5-letter groups to FAHAA using 50 baud RTTY at 2150. (Boender-Netherlands)
- 3151.0 PCD-Israeli Mossad number station in USB at 2230. (Boender-Netherlands)
- 3152.0 Vancouver Radio working unidentified station periodically in USB voice and data at 0500. (Jeff Haverlah-Houston, TX)
- 3290.0 RGC7-Kiev Meteo, Ukraine, with 50 baud RTTY synoptic weather broadcast at 2112. (Boender-Netherlands)
- 3314.0 HEP-Interpol Zurich, Switzerland, with CW V marker at 2115. (Boender-Netherlands)
- 4125.0 USCG COMSTA Kodiak, AK, with a securite broadcast in USB at 1404. (Lyons-CA)
- 4372.0 QZF working ROP with tracking ops in USB at 2230. (Gerguson-PA)
- 4446.4 US Army MARS stations with SITOR-B transmission at 0046. (J.L. Metcalfe-KY)
- 4448.0 SAM 300 working Andrews (Mystic Star) in USB at 0049. (Metcalfe-KY)
- 4469.0 English female 3/2-digit number station in AM at 0120. (Claudia Lyons-Muir Beach, CA) *Welcome aboard, Claudia; please check in often-Larry.*

- 4495.0 SCACS S-304, Ironwork working Nightwatch in USB at 1540. (Haverlah-TX)
- 4724.0 Andrews GHFS with 86 character EAM at 2047 in USB. (Baker-OH) Handball testing with a fast count in USB at 0209. (Keegan via Boender and Internet)
- 4787.0 6VU23/73/75-Dakar, Senegal, with 50 baud RTTY RYs at 0735. (Bill Mussen-Annandale, MD) *Welcome aboard, Bill-Larry.*
- 5320.0 USCGC *Point Noel* working Group Corpus in USB at 1626. (Haverlah-TX)
- 5693.0 USCG, 6012 working Traverse City, MI with position report in USB at 2300. (Ferguson-PA) *Thanks, Harry; first report of the CG on this one versus the old 5692-Larry.*
- 5696.0 SAM 202 working Andrews (Mystic Star) in USB at 1625. (Wilczynski-MA) *Boy, I bet this made the USCG a bunch of happy campers-Larry.*
- 5700.0 SCACS P-381, Vulcanize (Navy aircraft) working Bluestone in USB at 1620. Pool Hall working Trousers and Teapot in USB at 1335. (Haverlah-TX) Nightwatch calling WAR 46 at 0140 in USB, returned to Lima Lima. (Swietek-AZ)
- 5715.5 Possible US Navy Link 11 transmission in USB at 0228. (Haverlah-TX)
- 5870.0 Unidentified CW station sending 5-letter groups at 0504. (Sue Wilden-Columbus, IN)
- 6230.0 Eddie or 80 calling Waiver twice, no answer in USB at 0407. (Gerguson-PA)
- 6516.0 Yellowtail 03 (unidentified Lamps helo) working CTU (Commander Task Unit) at 1749 in USB. (Baker-OH)
- 6586.0 New York ARINC working Emory 007 with IFE, losing oil pressure in one engine. USB at 0345. (Mike Adams-Hutto, TX)
- 6683.0 Andrews (Mystic Star) working Air Force 2 and SAM 27000 in USB at 2300. (Bob Wilczynski-Springfield, MA)
- 6697.0 MKL working 2VL in USB at 1142. (Mr. TV in UK)
- 6706.0 Otter 46 working Phoenix 02, Raymond 24 and Trenton military, Otter 46 airborne with equipment problems, may have to take fuel off load from tanker aircraft. Moved to 11214 then 6751, nothing heard after 9153. (Swietek-AZ)
- 6712.0 Lajes GHFS working 3F7 (at Diego Garcia) in USB at 0254. (Haverlah-TX)
- 6715.0 Nightwatch working MacDill GHFS with voice and data in USB at 0323. (Haverlah-TX)
- 6717.0 Air Force 2 working Andrews (Mystic Star) with phone patch to SAM Command on F-875 at 0102 in USB. (Baker-OH) Air Force One working Andrews in USB at 0200. (Lyons-CA)
- 6730.0 SCACS X-903, Bluestone (Navy aircraft) working Nightwatch in USB at 2334. (Haverlah-TX) Andrews (Mystic Star) working SAM 204 in USB at 2300. (Wilczynski-MA)
- 6735.0 US Navy Foxtrot Tango net in USB at 2319. NORAD station Blue Crab working Huntress in USB at 0405. (Haverlah-TX) US Navy FT net working Black Eagle 2 (E-2C aircraft) in USB at 0045. (Wilczynski-MA)
- 6736.0 Sidecar calling Warship *Iroquois* in USB at 0013. (Keegan via Boender and Internet)
- 6739.0 Offhand calling McClellan GHFS in USB at 0634. (Haverlah-TX) Reach 11E2 working Thule GHFS in USB at 0015. (Bob Lewallyn-Houston, TX)
- 6745.0 Trenton Military working NATO 15 in USB at 0348. (Haverlah-TX) SYN2-Israeli Mossad number station in USB at 0300. (Bob Madorin-Lenexa, KS)
- 6750.0 Nightwatch 01 working Lajes GHFS with data transmissions in USB at 0509. (Haverlah-TX)
- 6761.0 SAM 202 (G-20B, tail 86-0202) working Andrews (Mystic Star) with phone patch to SAM command at 2330 in USB. (Baker-OH)
- 6836.0 Seventh Marines working a very weak LAR on this frequency and on 75, 311 in USB at 2305. (Haverlah-TX)
- 6871.0 USAF, Aria (?) 93 in contact with Hurlburt radio maintenance at 1931 concerning SATCOM tests. SATCOM frequencies passed were 295.95 MHz uplink and 272.325 MHz downlink. HF comms in USB. (J.L. Metcalfe-KY)
- 6902.0 Unidentified station sending meteorology codes using 75 baud RTTY at 2143. (Dix-NY) *Probably USAF AWS station at Elkhorn, NE-Larry*
- 6961.0 MFA Oslo, Norway, with Twinplex broadcast at 0942. (Denman-UK)
- 6970.0 English female 3/2-digit number station in AM at 2135. (Dix-NY)
- 6993.0 Air Force One working Andrews (Mystic Star) with phone patch to Crown in USB at 2319. (Haverlah-TX) SAM 202 working Andrews (Mystic Star) in USB at 0348. (Wilczynski-MA)
- 7606.6 RFHJ-Papeete, Tahiti, with ARQ-E3 (100/400) French "controle de voie" at 0715. (Mussen-VA)
- 7640.9 CW numbers station with 5-digit number groups at 1800 (Sunday UTC). (Boender-Netherlands)
- 7650.0 BZP57-Xinhua Beijing, China, with 75 baud RTTY news broadcast at 1845. (Denman-UK)
- 7657.0 32C (USCG aircraft) working Shark 09 (USCGC on DEA mission)
- 7668.0 8BY-Unidentified station sending V CW marker and 3-digit groups at 2156. (Dix-NY)
- 7832.4 USAF MARS stations AFA1DA and AFA3VP in PACTOR mode at 0224. (Metcalfe-KY)

- 7855.0 ROK24-Moscow Meteo, Russia, with 50 baud RTTY weather at 1744. (Denman-UK)
- 7975.0 SPW-Warsaw, Poland, with SITOR-B broadcast at 1841. (Denman-UK)
- 8063.0 Unidentified station sending 5-letter groups using 75 baud RTTY at 1834. (Denman-UK)
- 8068.0 Unidentified station with Polish language SITOR-B broadcast at 1818. (Denman-UK)
- 8240.0 3EFX4-Avenger working Portishead (8764) in USB testing R/T circuit at 0200. (Keegan via Boender and Internet)
- 8297.0 AAC2 working AADT in USB at 2255 passing position reports. Sounds like the Navy. (Ferguson-PA) *Nope, US Army, AAC2-Ft. Eustis, VA, Harbormaster, and AADT is a US Army vessel-Larry.*
- 8524.0 P5A-Unidentified station sending the following in CW: "VVV 8534 8534 de P5A QSA?" CW was hand sent - ACC Pyongyang? (Dix-NY)
- 8564.0 LZL-Bourgas Radio, Bulgaria, with DE CW marker at 2125. (Dix-NY)
- 8570.0 XVT-Da Nang Radio, Vietnam, with CQ CW marker at 1024. (Dix-NY)
- 8634.0 FUG-French Naval La Regine, France, with V CW marker at 1211. (Dix-NY)
- 8689.0 XSF2-Mexico working XKCT in CW at 1047. (Dix-NY) *Jack, I believe this one is located in China versus Mexico-Larry.*
- 8765.0 Lukewarm working Romeo 17, said to use green, white and black leads on box in USB at 2056. (Keegan via Boender and Internet)
- 8843.0 Honolulu ARINC working Reach 80211 (C-5) with #3 engine shutdown due to leaking fluid. Noted in USB at 0319. (Baker-OH)
- 8967.0 Roll Call with a 75 character EAM: preamble WZBPKK at 0412 in USB. (Charles Alexander-Columbus, OH)
- 8971.0 U.S. Navy units S4JGB working G8V in clear and green using USB at 1340. (Haverlah-TX)
- 8989.0 SAM 206 and SAM 200 working Andrews (Mystic Star) in LSB at 1950. (Paul Swietek-Gilbert, AZ) Silentwind 5129 calling any station in USB at 0045. (Swietek-AZ)
- 8992.0 Nightwatch 01 working MacDill GHFS with phone patch to Waldorf for connectivity check in USB at 0035. SAM 972 working Ascension GHFS (Haverlah-TX) *Waldorf is a GEP station in Maryland-Larry.*
- 9007.0 Trenton military working Air Force One in USB at 0120. (Wilczynski-MA)
- 9014.0 Deck 31 working unidentified station, moved to 6706 and 6746, but never connected. In USB at 0212. (Swietek-AZ)
- 9017.0 USAF, Sentry 50 (enroute to Nellis) working Raymond 7 (Cannon AFB, NM) with phone patches in USB at 2205. (Haverlah-TX)
- 9018.0 SCACS X-904, Ironwork working Nightwatch and Uncle Joe in USB at 1545. (Haverlah-TX)
- 9022.0 Waver 13 working Waver 12 (Possible civilian operators on Jstars E-8 aircraft) in USB at 0430. (Lewallyn-TX)
- 9022.0 Dragnet Uniform working Sidecar (Canadian NORAD Station?) in USB at 2039. Talked about moving Link-11 to another frequency. (Baker-OH) *Yes, Rick, the only thing I can reasonably confirm about Sidecar is its Canadian roots. They seem to act like a major command post (probably at CANFORCE headquarters). Anybody else have any ideas on this or other NORAD callsigns-Larry?*
- 9023.0 NORAD, Dragnet Victor working Deerhunter and Bandsaw Hotel in USB at 1930. (Haverlah-TX) *They still use the old freq sometimes-Larry.* Thule GHFS at 0001 in USB working unidentified aircraft. (Baker-OH) *Interesting-Larry.*
- 9057.0 SCACS S-309, Nightwatch 01 working Redeemer, Teeball, and Tabulate in USB at 2130. (Haverlah-TX)
- 10160.0 SUA251-MENA Cairo, Egypt, with 75 baud RTTY news bulletins at 0948. (Denman-UK)
- 10493.0 FEMA/Shares quarterly National Emergency Communications Net with various agencies and stations checking in. All communications were in USB and the NECN exercise was also heard on 5211.0. In the middle of all this, several U.S. military stations popped up for signal checks not related to the NECN exercise. Calls included: Nightwatch, Princely, Mangrove and Molecule. (Metcalfe-KY)
- 10873.2 Paris, France (no ID) with ARQ-E3 (100/411) French "controle de voie" at 0025. (Mussen-VA)
- 10999.0 USAF 75 baud RTTY broadcast consisting of astronomical data (sunrise/sunset, moonrise/moonset, etc) and tide information for Haiti locations at 2027. (Metcalfe-KY)
- 11038.6 DDH47/DDH9-Hamburg (Pinneburg), Germany, with 50 baud RTTY, English navigational data and RYs at 1730. (Mussen-VA)
- 11053.0 SAM 972 working Andrews (Mystic Star) in USB at 2330. (Lewallyn-TX)
- 11175.0 AAFA (US Army vessel) working Ascension GHFS with phone patch to AAC2-Ft. Eustis, VA, Harbormaster in USB at 0031. 3KT working Bayonne Global with phone patch to COMSUBLANT watch officer with an Exercise Esteem Alpha in USB at 1315. (Haverlah-TX) Spar 64 working Incirlik GHFS at 1103 in USB. (Mr. TV in UK) Offutt GHFS with a 20 character EAM broadcast for "all regions" in USB at 1632. I remember hearing an EAM for Delta region a few months back. (Metcalfe-KY) *Jack, I think some of the 20 characters go to the Navy-Larry.*
- 11214.0 NORAD, Warship Iroquois (aka HMCS Iroquois) periodically working Sidecar with Alligator chatter in USB at 2148. Also noted Chalice Alpha working Raymond 24 in USB at various times. (Haverlah-TX)
- 11217.0 King 81 working MacDill GHFS for weather information in USB at 1825. (Alexander-OH) *MacDill Global discrete channel-Larry.*
- 11220.0 SAM 683 working Andrews (Mystic Star) in USB at 1939, moved to 6683. SCACS S-310, Nightwatch 01 working WAR 46 at 2334 in USB. (Haverlah-TX)
- 11224.0 Cobra ?? calling Cobra Ops in USB at 1902. (Haverlah-TX)
- 11226.0 SCACS X-905, Nightwatch 01 working Modify and Freehand in USB at 2119. (Haverlah-TX) SAM 972 working Andrews (Mystic Star) in USB at 0052. Nightwatch 04 working Puncture with EAM at 0000 in USB. (Swietek-AZ)
- 11243.0 Nightwatch 04 (female operator) weak here calling WGY918 with no success in USB at 1623. (Haverlah-TX)
- 11244.0 Offutt GHFS with EAM broadcast 6/20/26 characters at various times. (Haverlah-TX) Firedome with phone patch from Andrews to Java Jive passed message in 4 groups, "NDGT22 LNKE6S" in USB at 0211. (Keegan via Boender and Internet)
- 11267.0 Head Gear in USB at 2143 with EAM broadcast. (Wilczynski-MA) *I have also noticed some EAM activity on the old Navy HICOM frequencies-Larry.*
- 11270.0 Russian male numbers station in USB at 0820 (Saturday UTC). (Boender-Netherlands)
- 11271.0 Weak U.S. Navy Link 11 in USB at 1608. (Haverlah-TX)
- 11460.0 Andrews (Mystic Star) working Casey 01 enroute NAS Norfolk, VA in USB at 0038. (Swietek-AZ)
- 11466.0 SPAR 65 working Andrews (Mystic Star) at 2222 in USB. (Swietek-AZ)
- 12170.5 CLP1-MFA Havana, Cuba, with encrypted messages and circulars in the clear at 1509 using 75 baud RTTY. (Metcalfe-KY)
- 12184.0 Unidentified station sending meteorological codes using 75 baud RTTY at 1914. (Dix-NY)
- 12295.0 Hotel 7 Alpha (NCS) with weekly training net at 1437 in USB. Other stations heard were Lima 4 Romeo, Foxtrot 5 Bravo and Echo 3 Whiskey. (Metcalfe-KY)
- 12720.0 UGH3-Unidentified station with CQ CW marker at 2101. (Dix-NY) *This is Provideniya Radio in Russia-Larry.*
- 12947.0 UUI-Unidentified station calling 4KA in CW at 1904. (Dix-NY) *This is Odessa Radio in the Ukraine-Larry.*
- 13200.0 USAir 776 working Thule GHFS in USB at 1652 with phone patch traffic. (Haverlah-TX)
- 13211.0 SCACS S-312, Anklebone working Nightwatch 01 in USB at 1852. Also heard on 9017 (X-904), 11220 (S-310), 11244. (Haverlah-TX)
- 13242.0 Bigtown working McClellan GHFS for HF data transmission in USB at 2005. (Haverlah-TX)
- 13247.0 Navy Lima 45 Delta (aka Lima Delta 45 November) working Albroom GHFS with phone patch traffic in USB at 1855. (Haverlah-TX)
- 13437.0 RPFN-Portuguese naval radio Lisbon, Portugal, with 75 baud RTTY marker at 1500. (Dix-NY)
- 13826.0 US Navy MARS stations working each other in USB, moved to 13643.0 at 2300. (Swietek-AZ)
- 144851.1 RFTJ-Dakar, Senegal, with ARQ-E3 (48/392), French "controle de voie" at 1545. (Mussen-VA)
- 14485.0 Brigendnaut, Cayenne (no ID), with ARQ-E3 (192/378) French notification of change of Bordeaux Police tribunal appearance date at 2030. (Mussen-VA)
- 14615.0 Reach 214YA (tail number 70002, C-141B aircraft) working Ascension GHFS with phone patch to Hilda east in USB at 2048. (Haverlah-TX) Reach Reach 90003 (C-5 aircraft) working Ascension GHFS (here from 11175) with phone patch to Patrick Albroom GHFS command post in USB at 2016. Gave ETA to Patrick. Ascension operator told him to be sure to check out "the Coconuts Club in Cocoa Beach." (Paul Guthrie-Maynard, MA)
- 14674.0 DFZG-MFA Belgrade, Serbia, with English Tanjug news using 75 baud RTTY at 1533. (Dix-NY)
- 14890.0 Russian male numbers station in USB at 0800 (Saturday UTC). (Boender-Netherlands)
- 14931.0 8BY-Unidentified station sending V CW marker and three number groups in CW at 1552. (Dix-NY) *I've gotten three letters that indicate this station is not in Indonesia as previous reported. Any guesses?-Larry.*
- 15016.0 Navy 50511 working Albroom GHFS with unsuccessful phone patch to NAS Jacksonville, FL, DSN numbers in USB at 2003. (Haverlah-TX)
- 15041.0 Andrews working Nightwatch 01 in USB at 2014. (Haverlah-TX)
- 15925.0 Unidentified station repeating 135 (5 times) in CW at 1600. (Dix-NY)
- 18046.0 SCACS P-384, Offside working Nightwatch 01 in USB at 2144. (Haverlah-TX)
- 19109.0 OZU25-MFA Copenhagen, Denmark, with Twinplex traffic at 1429. (Denman-UK)
- 19216.3 RFLI-Fort de France, Martinique, with ARQ-E3 (96/404) French "controle de voie" at 1800. (Mussen-VA)
- 20083.6 ANSA-Rome, Italy, with 50 baud RTTY in French, news at 1604. (Mussen-VA)
- 20477.0 CLP1-MFA Havana, Cuba, calling 45 (Probably CLP45-Luanda, Angola-Larry) in CW, but no reply at 1400. (Denman-UK)

### Listening Post Improvements

If you've been following my previous 1995 columns, you already know how to convert a TV antenna to monitor the scanning bands. You also know where to find old, but working, crystal-controlled radios, and you realize the benefits of erecting a dedicated 800 megahertz antenna and feed line (March and April "Scanning Reports"). In this month's issue, we'll pull it all together by assembling it into a tidy, "professional" listening post.

Readers who may have missed those previous columns can order reprints through *Monitoring Times*, P.O. Box 98, Brasstown, NC 28902 or call 1-800-438-8155. However, the previous columns aren't prerequisites for incorporating any of the additional information, hints, and ideas from this month into your listening post.

#### ■ Placement

Placement of your scanner radios is critical. Each radio must be within easy reach and securely mounted. Desktop scanner radios can be mounted under a shelf by using a universal mobile mounting bracket. Radio Shack carries several different types of brackets that can be utilized. Installation of the brackets may also require a modification to your scanner radio's case. The exact mounting configuration will depend upon your skills and imagination.

Extension speakers, adapters, and other scanning accessories should also be mounted *above* your writing area. You'll need open desk space to research frequency guides, books, and other written material.

#### ■ Save Time by Labeling

The scanner radios in your listening post should also be labeled. Suppose for a moment that you're monitoring a high speed police chase. As the action moves through specific cities and/or communities, the frequencies may change. If you can't remember where those frequencies are stored, following the action will be impossible. A small label affixed to your scanner radio will refresh your memory and prevent you from missing the action.

Since we're not that far away from the summer thunderstorm season, here's another example: Suppose again that you're monitoring a high speed police chase, and a thunderstorm develops. How can you continue to monitor the action without risking lightning damage to your equipment? If your scanner radios are labeled, you can immediately switch to the radio that is battery powered and connected to an indoor antenna.

Antenna coax cables and power cords should also be labeled and separated. A short circuit in a power cord could flash over and enter your coax cable. If that happens, the internal components of your expensive scanner radio will be fried. It's okay to bunch power cords together, and it's equally permissible to bunch coax cables together. But, it's not okay to combine them. To prevent costly accidents, power cords and coax cables should be routed along two different pathways.

Stickers, labels, and tags can be found in your local office supply



*With a little imagination and ingenuity, you can construct an impressive listening post that won't bust your budget.*

store. But don't limit yourself to the obvious. To identify distributor wires and vacuum hoses, auto mechanics use a handy gadget that dispenses a sticker that wraps around the wire. The sticker dispenser can also be used to identify your coax cables and power cords. The dispenser can be purchased from auto supply stores.

#### ■ Using Multiple Scanners

Crystal-controlled radios can be purchased at flea markets and yard sales. If you're not using crystal radios in your shack, you're missing out on some low cost, but highly reliable listening. Crystal-controlled radios can provide you with a very stable and noise-free signal. (See *Scanner Collecting* feature for more on how to find these treasures - ed.)

The problem, as you already know, is finding a crystal for a particular frequency. If you enjoy canvassing flea markets and yard sales, it may be possible to find another crystal radio with the desired frequency. Crystals can sometimes be switched between different models of the same brand.

Your second option is to contact G&G Communications, 9247 Glenwood Drive, Leroy, NY 14482, (716) 768-8151. G&G repairs nearly every type of scanner radio, regardless of age. G&G also has a large supply of crystals for the old Bearcat and Regency scanner radios. If they don't have what you need, you can ask to be placed on their waiting list.

Listening to more than one scanner radio at one time is an important skill that anyone can master. Adjust the volume of each radio to a slightly different level. Your ears will become accustomed to picking out the important points of each broadcast. It takes a little practice, but it can be done.

If you're handy with soldering iron, it's also possible to connect two jacks to a stereo headphone set. One jack is plugged into scanner radio #1 and the other jack is plugged into scanner radio #2. You'll

hear a different radio in each ear. Again, it may seem like a confusing way to monitor, but it really isn't. After a little practice, you'll be wishing that you had three ears!

### ■ Play it Safe

With today's technology and high priced gear, it's easy to invest thousands of dollars in the hobby of scanning. Smoke detectors can be purchased for less than ten dollars, but it's not very likely that there's a smoke detector in your listening post. The lack of a smoke detector is especially problematic if your listening post has an entrance door. If the door is closed and a fire develops within the listening area, the smoke may not be capable of reaching a detector that is in an adjacent room. If you don't have a smoke detector in your listening post, install one today!

Improving your listening post doesn't require large sums of cash or state-of-the-art equipment. With a little imagination and ingenuity you can construct an impressive listening post that won't bust your budget.

### ■ Treasure Hunt

Are you ready for a trip down memory lane? In our May/June Treasure Hunt, we're offering two reconditioned scanner radios from G&G Communications. The Bearcat III and a Bearcat V are vintage radios that feature eight channels across three bands—VHF Low, VHF High, and UHF. As I've already mentioned, the radios are not new, but they are very much alive. Each radio is complete with power cord and inside antenna. The crystals that are provided may or may not be active in your area, but that shouldn't be a problem—crystals can be purchased from G&G Electronics.

To win an original, reconditioned Bearcat scanner for your listening post, answer the following questions.

1. The "Bearcat" scanner radio was named after an automobile. True or False?
2. Name the individual who invented the Bearcat scanner radio.
3. Name the present-day manufacturer that first produced a scanner radio called the COMP-100 (It required a look-up book).
4. The Bearcat BC210 was first introduced in 1977. True or False?
5. What type of external antenna plug was utilized in the early scanner radios?

G&G Communications repairs most types of monitors, scanners, and pagers. They also modify scanner radios and buy used scanner radios, working or not. For more information, write or call: G&G Communications, 9247 Glenwood Drive, Leroy, NY 14482, (716) 768-8151. Don't forget to mention *Monitoring Times*.

### ■ Frequency Exchange

Maritime monitors will love our first stop. Welcome to the **California coastline**. Jon Van Allen is a radio electronics officer for a major ship transport company. Here are the port frequencies that Jon uses when he's at work.

Port	Transmit	Receive
Oakland	461.9375	461.9375
Long Beach	463.7125	463.7125
"	468.9875	468.9875

Port	Transmit	Receive
Seattle	467.750	467.750
"	468.9875	468.9875
Honolulu	469.0375	469.0375
"	469.6625	469.6625

John Newly lives in **Jamestown, California**, and here are his favorite monitoring targets.

45.32 .....	Calaveras Sheriff	156.165 .....	Highway maintenance
45.42 .....	Sheriff	168.35 .....	Yosemite Park Guards
45.54 .....	Sheriff	171.80 .....	Yosemite Park Guards
45.92 .....	School buses	462.95 .....	Mednet dispatch
153.725 .....	Water company	462.9875 .....	School buses
153.80 .....	Sonora PD	463.025 .....	Mednet Hospital
155.16 .....	Search and Rescue		

Moving east to **Davis Monthan Air Force Base in Arizona**, we'll stop in and visit with an anonymous contributor.

138.075 .....	OSI (Off. of Spec. Invest.)	148.525 .....	Munitions
138.175 .....	OSI	149.224 .....	Fuel
139.80 .....	Operations	150.15 .....	Supply Dept.
141.55 .....	Operations	162.25 .....	Base Operations
148.575 .....	Maintenance	163.00 .....	Security
148.20 .....	Maintenance	164.9875 .....	Law enforcement
148.30 .....	Maintenance	173.4375 .....	Motor pool
148.475 .....	Crash crews	173.4875 .....	Medical services
148.50 .....	Maintenance	413.10 .....	Command net

Traveling to the opposite coast, we'll stop to visit with Mike Feldman in **Atlantic City, New Jersey**.

153.77 .....	Fire	155.925 .....	Margate Police
154.025 .....	Fire	155.97 .....	Police
155.010 .....	Ventnor Police	460.075 .....	Ventnor Police
155.130 .....	Police	460.15 .....	Police
155.175 .....	EMS	460.325 .....	Police
155.535 .....	Margate Police	460.425 .....	Police

Dr. Stan Glass lives in **Miami, Florida**, and has invited everyone to come on down for a free rabies shot. (You're right: Dr. Glass is a veterinarian.) Here are his favorite frequencies.

118.30 .....	Miami Tower	125.200 .....	Palm Beach Approach
119.45 .....	Approach	129.20 .....	Delta Airlines
120.90 .....	Executive area	132.95 .....	Customs
121.20 .....	Clearance delivery	323.000 .....	Miami Center low altitude-Navy
123.70 .....	Havana Center	340.200 .....	Military Control
124.70 .....	Miami Center	407.775 .....	Postal Inspectors

Moving north across the state line, we'll stop at the home of "Dan." Dan has given us permission to enjoy his hospitality, but we can't tell anyone his last name. Dan lives in **Marietta, Georgia**, and here are his frequencies.

#### Cobb County Police

856.2125	857.7375	858.9875	860.2125
856.7375	857.9875	859.2125	860.7375
856.9875	858.2125	859.7375	860.9875
857.2125	858.7375	859.9875	

#### Marietta City

151.625 .....	Sam's wholesale store	154.905 .....	Police
151.685 .....	Marietta High School	154.935 .....	Police
154.755 .....	Cobb County Correction Fac.	155.79 .....	Police
153.77 .....	Fire	159.09 .....	Police

Tom Belkin lives in Mifflin County, Pennsylvania. He monitors a lot of the same frequencies we listed from Anthony Swailes last month, but here are some additional ones:

33.90 .....	Lancaster County fire	152.33 .....	Altoona Cab base
39.42 .....	Juniata Co. Sheriff	152.45 .....	Yellow Cab base
39.52 .....	Mifflin & Port Royal Boro Pol.	154.155 .....	Harrisburg State Hospital
46.02 .....	Mechanicsburg Police	154.755 .....	State Police
47.58 .....	Dr. Brofee, special emergency	155.01 .....	Hollidaysburg Police
47.90 .....	West Penn Power Company	155.055 .....	Orbisonia Boro Workcrew
151.16 .....	Little Buffalo State Park	453.90 .....	Water Authority
151.37 .....	Fire tower	458.90 .....	Water Authority
151.40 .....	Fire tower	460.15 .....	Mifflin County Fire Police
		460.60 .....	Mifflin County Fire

Tom's list contains more than 150 frequencies for central Pennsylvania. To receive the complete list, send a #10 SASE to the Frequency Exchange, P.O. Box 98, Brasstown, NC 28902.

Since we're already in Pennsylvania, let's visit with Jim Slater. Jim lives in Scranton, Pennsylvania, and he routinely listens to the following frequencies.

37.74 .....	PP&L Electric	453.375 .....	Scranton Police
124.500 .....	Avoca Airport	453.50 .....	Scranton Fire
154.31 .....	Lackawanna Fire	453.70 .....	Scranton Police
154.57 .....	McDonalds order window	463.50 .....	Verto Cable TV
155.70 .....	Scranton Police		

Inviting the Frequency Exchange to your home town is easy. Send your favorite frequencies to the Frequency Exchange, P.O. Box 98, Brasstown, NC 28902.

## ■ Scanning Live

Scanning live entertainment in local establishments is possible, but you have to be very close to the action. The radio signals from cordless microphones rarely travel more than a hundred feet. If you couldn't get tickets, it may be possible to hear the show from the parking lot. Here are a few of the frequencies to check:

169.505	171.905	183.60	200.30
170.245	174.50	186.20	202.20
170.305	176.20	186.60	203.00
171.045	177.60	189.00	206.00
171.105	180.40	190.60	208.20
171.845	182.20		210.00

Don't forget that the above frequencies may also be used by law enforcement agencies.

## ■ Bumper Beepers

Bumper beepers are low power transmitters that can be placed on a vehicle or used by an individual. If you monitor a bumper beeper, consider yourself to be in a "danger zone." Your local police or federal agents could be nearby! Here are a few frequencies to check:

31.01/03/05/07/09/11/13/15  
31.29/31/33/35  
33.00/03/05/07/41  
37.00/43/89  
38.00  
39.00

To receive a free list of bumper beepers and wireless microphone frequencies, send an SASE to the Frequency Exchange, P.O. Box 98, Brasstown, NC 28902.

## ■ Tijuana Jam

A transportation company located in Tijuana, Mexico, is transmitting on the same frequency used by the Los Angeles County Fire Department. Fire fighters are concerned because they rely on radio communications when battling brush fires. An official investigation found radio interference contributed to the deaths of two county fire fighters in the August 1993 Glen Allen wild fire.

The Tijuana company, licensed by Mexico authorities to transmit on the frequency, is cooperating with the Federal Communications Commission. The Altadena county fire units and the Mexican company were scheduled to run a joint radio test in an effort to solve the problem. (News clippings from the *Press-Telegram* and *Dispatch Monthly*.)

## ■ Long Beach Jam

Two drug dealers in Long Beach, California, were using a modified two-way radio to interfere with Long Beach Police radio broadcasts. The two suspects used their illegal radio to harass the police for approximately two weeks.

The radio jamming ended when the two suspects were arrested as they made illegal broadcasts from a parked pickup truck. Charges of obstructing justice and interfering with police officers were filed by local authorities. The Federal Communications Commission has also filed charges that included a penalty of \$10,000 dollars per day and up to one year in prison for operating an illegal transmitter. (News clipping from the *Press-Telegram*.)

## ■ CB Jam

A CB radio operator in Avoyelles County, Louisiana, was convicted of using his CB radio to transmit "offensive, derisive and annoying words, with the intent to deride, offend or annoy."

The culprit was fined \$100.00 dollars court costs, a victim's reparation fee of \$7.50 and he was ordered to pay \$18.00 in witness fees. (News clipping from the *Marksville Weekly News*.)

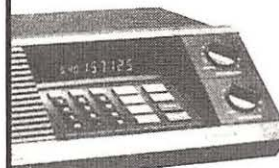
## ■ Scanner Tip

In Saint Louis, Missouri, a bandit robbed the local 7-Eleven store. After severely beating the clerk, the bandit ran out of the store, forgetting to take the cash. He then reentered the store and took the entire cash register.

The next day, an unknown scanner buff called the police and provided the name of the bandit. The hobbyist had monitored one of the bandit's friends talking about the robbery on a cordless phone. (News clipping from Bob Fick.)

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- **Filters:** (kHz) SSB 4 AM/NFM 12 WFM 180
- **Memories:** 50 ch. x 20 banks=1000 total
- **Size/Wt.:** 6.1 x 2.8 x 1.6 inch.  
20 oz. batt. incl.

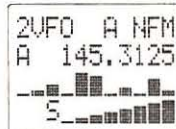
\* Cell blocked for all, but Approved agencies.



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.1 - 1900MHz\*



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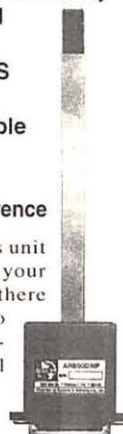
Δ Frequency coverage up to 10MHz Δ Display - 3.1" HQM Simple matrix color LCD Δ Resolution: 5 or 30kHz selectable Δ Input: 10.7MHz Δ 50dB Dynamic range Δ Screen refresh 2/s Δ Composite video out Δ Full computer control Δ Video output NTSC or Pal display, on TV or record on VCR Δ RS232 9600bps Δ Instant receiver set from cursor via RS232 Δ Store image on disc or your video recorder Δ Menu driven system makes SDU5000 simple to operate Δ SDU5000 is designed to work with the AR3000A (modified with a 10.7MHz output) using RS232 link with or without a computer. Other receivers with 10.7MHz IF output but digital linking may not be straight forward.

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- Δ Optional 100% shield computer cable from AR8000INF to computer for reduced interference

Unlike some of the European devices sold today, this unit is smaller, lighter, and makes no power demands on your receiver. With the extra shielding and smaller size there is less chance of additional interference leaking into your radio. The AR8000INF is also the only interface that is upgradeable for use with the optional Tape recorder controller due first quarter '95.



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### Volunteer Testing

I've reached the age where I am starting too many statements about the radio hobby with the phrase . . . "Back when I," as in "Back when I bought my first scanner" or "Back when I built my last Heathkit." As the radio writer tasked with the duty of bringing beginners up to speed, I like to challenge myself with new experiences so I don't find myself caught up in the "Back when I" syndrome too often.

That said, let me start out by saying . . . "Back when I" took my last ham radio exam (for Advanced Class privileges), the Federal Communications Commission still held their own testing sessions. Each upgrade to higher amateur radio operating status meant a trip to my not-so-nearby FCC regional field office, taking a day off of work, and the inherent expense of the trip. But, that was the way things had been done ever since the "gummint" began licensing amateurs back in the days of spark gap transmitters.

Things are different for prospective hams today. Since 1984, Technician Class and above (and now *all* classes of licenses), can receive their testing and licensing through the services of the Volunteer Examiner Program. Now anyone interested in getting on the air as an amateur can go for their ticket with relatively little fuss and bother, beyond the actual studying needed to pass the test. VE testers are hams themselves; folks who care enough about amateur radio to devote their own time and energy to giving people a convenient pathway to hamdom.

I had been meaning to upgrade to Extra Class since about 1982 or so. I finally did my studying for a couple of months and this time entered into the same Volunteer Examination experience as any beginner going for his or her Novice or No-Code Technician. Hence, a "hands on" beginner's experience for me.

#### ■ Ready

Okay, you've studied hard. You have all but memorized the question pool in your license manual. You have given a good half hour each evening to getting through the code so you have 5 words per minute down cold. *Now what?*

For many folks, tracking down a VE testing site might be the most difficult part of the testing experience. Since I was already licensed "the old way," all I had to do was get on my local 2 meter repeater and ask a few questions. I discovered no less than six VE testing groups convenient to my QTH (that's ham talk for "where you live").

Assuming you are not on the air, you can try the next best thing. If you know any area amateurs, ask them if they know of any VE sites or if they can check around for you. This is sure to turn up a few locations. If you are a scannist, monitoring local ham repeaters might turn up some information, especially if your area repeater group has any

regularly scheduled emergency service or club nets. Also, keep an eye (or ear) out for notices touting area hamfests and ham conventions (such as the Convention Calendar in the back of *MT*). Most formal ham get-togethers will offer VE testing as part of the program.

If these resources fail or if they are not available to you, don't despair. You should be able to get information on local VE sites from the following resources. Also, a quick call to your regional FCC field office (check the "Blue Pages" of your phone book) may give you a few leads.

#### American Radio Relay League (ARRL)

VEC Office  
225 Main Street  
Newington, CT 06111-1494  
(203) 666-1541

#### The W5YI Group, Inc.

P.O. Box 565101  
Dallas, TX 75356  
(800) 669-9594

You will find that, since VE's live in the real work-a-day world like the rest of us, testing opportunities usually occur at convenient times, often evenings and weekends. Areas with several groups tend to hold tests on different days, which almost guarantees you'll find a testing time that you can live with.

#### ■ Get Set

So now you have identified your testing site, now how does the whole process work? There are a few tasks you have to perform in preparation for hitting the VE test site.

VE testing groups are currently authorized by the FCC to collect a fee of \$5.90 for the testing process. Do yourself and the VE group a favor and bring exact change with you to the test event.

Call up the VE group ahead of time. You will want to do this for several reasons. First, you will need good directions to the VE test site. You will also want to know if they have any special expectations. Most VE test sites now provide you with a copy of FCC Form 610 (the license application form). If they tell you they do not, you will need to get a copy of the form to bring with you to the test by calling the FCC at (215) 752-1324. Make sure you allow enough time for the form to arrive before your scheduled test.

Bring two forms of identification. If at all possible, at least one of these IDs should have your picture on it. For my test I plopped down my driver's license and my *Monitoring Times* Press Card. What better ID can you

*"One half hour of study each night will prepare you for your exam"*



find than that! Young folks not burdened with a wallet full of credentials can bring their birth certificate as identification.

If you already possess an amateur radio license and are showing up for an upgrade test, you will need your original ham license and a clear photocopy. They will give you back your original, but the photocopy will be sent along with your paperwork to prove you have already passed the previous test elements from your current license. This can be very important. If you already possess a Novice license and you are planning to take the Technician class test, your Novice privileges will assure you Technician "Plus" status by virtue of previously passing the 5 word per minute code requirement.

The tools of modern test-taking are the same almost everywhere. Always bring two sharpened #2 lead pencils. In addition, make certain that you have an excellent eraser. If you change your answers, you want to be sure you can erase things completely to avoid any confusion; a question that looks, to the examiner, as if it has more than one answer will be marked as wrong. You should also bring a pen because you will have a few things to sign in ink.

Calculators are not only permissible at ham tests, they are recommended. All levels of theory test elements have enough math-based questions that they can mean the difference between a passing and failing grade. A basic pocket calculator with a square root function should be adequate. Complicated calculators with memory functions will come under intense scrutiny by the VE team. They will make you demonstrate that you have dumped any equations you may have stored in memory. Also, if your calculator has permanently programmed electronics equations it is likely to be disallowed.

Remember, you are there to demonstrate what you know, not what your calculator knows. Before the exam, practice with the calculator so that you are comfortable with its operating style. You're going to be nervous enough during the exam without needing to teach yourself how to operate an unfamiliar calculator. Make sure the calculator has fresh batteries. Avoid bringing a "solar powered" calculator, because the light level in the testing center might not be strong enough to allow for good operation.

If you're not absolutely sure of the location of the VE testing site, take a trip to the site prior to the date of your test. Needless to say, if you don't arrive on time, you'll probably be out of luck. These folks are volunteers and they want to get home to their families, too.

## ■ Go

Now you're ready to take the test. First things first: *relax*. This is a test, sure, but the results of it will not drastically change the course of human history. The world will not end regardless of your score and you can always take it again. In fact, many VE sites allow you to retake the test one additional time during the session you are attending. With all this said you can actually try to enjoy the test.

Most VE sites give the code tests first. You will be given the opportunity to run a minute or so of practice to make sure you are comfortable and can hear the code tape clearly. If you have any problems, speak up.

The most important thing about copying code for a test is to *never stop copying*! Even if you think you're not getting anything right, relax and drive on. In the end you will be surprised how much you actually copied. Even if what you wrote initially looks like gibberish, when you sit down to answer the 10 questions associated with the code exam you will likely discover that you have copied enough to figure out the answers.

Next comes the theory test. Again, relaxation is the key. When you get your test, you will also be given a sheet or two of paper for doing calculations. Once you have been told to start—before you even open the book—write down all of the electronic formulas that you can remember

from your studies. This will help prevent "brain freeze" when you come up against the math-based questions in the test.

Take the test in four passes, remembering to read each question and all four answers carefully. On the first pass, answer all the questions that you are sure of without hard thought. On the second pass, do the math problems and the harder questions. On the third pass, all you should have left are a few questions that just don't click for you. Try to narrow yourself down to two out of the four answers and then guess. Guessing is better than leaving something blank and assuring it will be marked wrong. On the fourth pass, check all your work even on the easy questions to be sure you haven't missed something.

As I said earlier, if you miss an element, you will probably have the opportunity to retake it at most VE sites. If all goes well you will walk away with a Certificate of Successful Completion of Examination (CSCE) and in about four to six weeks your ham license will be in your mailbox. If you only pass some elements leading to a particular class of license you will be issued a CSCE giving you credit for these elements. This CSCE proves what you have accomplished so you will only have to retake the elements you missed at the next VE testing session and not the ones you passed.

My VE testing experience was actually fun. There was a great feeling of camaraderie amongst the testers and the tested. For this reason I want to exercise writer's privilege and thank the members of The Bellmawr New Jersey Volunteer Examiners Team, Jim N2WFB, Lorna N2YHY, Ray WB2LNR, Lois N2OIS, Bill NT2N, Bob WA2UDO, and John N2VPN. I hope your VE testing experience is as enjoyable as these folks made mine.

Now I can start shopping for a "vanity" 1x2 call sign so I can be a real Extra Class curmudgeon.

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**ALASKA** KNLS tentative Z-95 shows English and Japanese hours at 0800 on 9615, 1300 on 7365 (Brian Johnson, FIDONET SW-Echo via George Thurman, Doug Dine via Diane Mauer, Jim Moats)

**ALBANIA** For Z-95, TWR Europe started using four 100 kW SW transmitters here, three at Cerrik and one at Shijak, for broadcasts to Europe and Mideast, none in English. At various times between 0345 and 1830, Cerrik on 6230, 7160, 11635,

9470, 9490, 12075, 11760, 9480, 9445, 12080, 7385, 13815; Shijak 0515/1530 on 7385, 9445, 7105. But at certain times some of the same frequencies are still from Monaco/France: 6230, 7160, 9490, 7355, 9480. Best bets for N. America: Cerrik 1630-1700 daily in Farsi on 12085, 13815; Shijak 0515-0530 daily Polish on 7385 (via Paul Brems, FIDONET SW Echo via Thurman) R. Tirana, Albanian to us on 9760 0000-0430 plays some oddly beautiful music, a bizarre mix of Arabic and opera (Kevin Hecht, PA, *World of Radio*)

**ARMENIA** Araks Radio Agency added new 7480 in Feb; Armenia and Georgia stayed on "summer time" of UT+4 all winter, so maybe would not have shifted 26th March (BBC Monitoring).

**BELGIUM** Relay swap with DW: RVI in German Mon-Sat 0830 on 7105 via Jülich; DW in Dutch via RVI MW 1512 Mon-Sat 1400-1430 (RVI RW)

**BOLIVIA** R. Nuevo Mundo, MW 1160, not 1170, planned to start SW soon, likely on 3170 (Rocco Controneo, Bolivia, *Play-DX*) R. Emisora San Ignacio, 4902.5 ex-4901.5 \*1050 regular, 1100 relaying R. Fides (Henrik Klemetz, Colombia, *W.O.R.*)

**BURUNDI** Rdif. Nat'l back on 6140, big signal at 0310 music, 0315 interval signal like non-stop laughing but really bird call, 0317 Bujumbura ID (Chuck Rippel, VA, *Fine Tuning*)

**CAMBODIA** National Voice has new fax, different from *WRTH*: +855-23-27319 (Fabien Serve, visiting Cambodia, via Wolfgang Büschel)

**CANADA** RCI's future unexpectedly threatened by government budget calling for RCI to come out of CBC funding, which itself was drastically cut; president of CBC then resigned (Bill Westenhaver, *W.O.R.*)

CHNX, Halifax, reactivated 6130 in early March, pretty strong at 1820 but audio breaks (Ed Rausch, NJ). Revived with recent vintage Harris 1 kW totally solid state, at first only with exciter, 28 watts, while building amp section, but coming in full strap and boogie here in Boston area; Wayne at CHNX tells me, and they do QSL (Peter George, N1GGP, *rec.radio.sw* via Rausch)

These Canadians get no respect from big brothers to the south; checking for CFRX, 6070 at 0700, found it swamped by WEWN in Spanish on 6065, with 500 times the power. BTW, WEWN frequency management is no longer handled by George Jacobs (gh)

**COSTA RICA** *Wavescan* retimed on AWR to Sun 1100 and 2300 (Adrian Peterson) But one week at 2307, another at 2255, another \*2337 without it on 13750; also announced new English schedule: 1100-1300, 1900-2000, 2300-0100, weekends also 1700-1800 (gh, *W.O.R.*)

**CUBA** RHC 6000 occasionally puts out horrific loud buzz on 5982-6023, blowing away everything in that range including itself (Kevin Hecht, PA)

**CZECH REPUBLIC** RFE/RL starting using all-digital studios in Prague on March 10 (Radio Netherlands *Media Network*) All 19 language sections there by mid-summer, except Czech and Polish which may be privatized (CTK via BBCM)

**DENMARK** [non] For one week in March, R. Denmark

*All times UTC; All frequencies kHz; \* before hr = sign on, after hr = sign off; // = parallel programming; + = continuing but not monitored; 2 x freq = 2nd harmonic; Z-95 = summer season*

experimented with hourly English newscasts, perhaps a pilot for regular English next year (gh)

**DOMINICAN REPUBLIC** Onda Musical on new 4774.5v-4774.86

ex-4779.55, 0025-0303\* but missing some nights (Brian Alexander, PA, *W.O.R.*) So avoiding Guatemalan on 4780- (gh)

**ECUADOR** Due to frequent breakdowns, HCJB decided to

use only one AM frequency, and keep the second transmitter as backup: 0700-0830 on 6205, 0700-1130 on 6135, 0030-0700 on 9745; plans to add two more 100 kW in 1996; *The Latest Catch* retimed to Wed 1030 (HCJB *TLC & DX Partyline*) Added popular children's show *Jungle Jam* Sat 1430 on 12005, 15115 (Ken MacHarg, HCJB)

Estéreo Carrizal, 3260, improved strength, and has English ID at \*1100 (Henrik Klemetz, HCJB *DXPL*)

La Voz de Saquisilí, if reactivated on 4900, normally operates 1200-1400 only, but may occasionally \*1000 or \*1100 for DXers (Velástegui, *DXPL*) R. Católica Nacional, Quito, planned to reactivate 5030; had difficulty getting parts (HCJB *TLC*)

**EL SALVADOR** R. Venceremos plans to resume SW for America, Europe, *my pronto* (Carlos Enríquez, RV, RN *Radio-Enlace*) On FM only lately, but was a memorable SW clandestine (gh)

**EQUATORIAL GUINEA** R. Africa back on 15189.98 ex-15185, US religion in English 2223-2256\* still announcing 7190; weak but clear (Brian Alexander, PA, *W.O.R.*)

**ETHIOPIA** [non] V. of Oromo Liberation, expelled from Sudan in 1992, is back via WHRI, 13760, two or three times a week around 1600/1615 for half-hour to half-sesquihour. Reception in E. Africa not very good. (Chris Greenway, BBCM, *RNMN*)

**EUROPE** R. Piraña will test on April 30, May 7 or both, at 2000-2100 to N. America, 2100-2200 to S. America on 13950 LSB; will later on move to S. America (J. R. García, Europe)

**FRANCE** RFI, not the Peruvian, on 3870, weak in Spanish at 2340, French 2357-0030+ // many higher channels (Brian Alexander, PA) It's a difference spur, 9790 minus 5920 (gh)

**GREECE** Macedonian station on new 7500 from before 2100 until 2305\*, best on USB due to Israel on 7495 (Kevin Hecht, PA) Not that great reception after 2100 but opens at 1400; augmenting 7430 due to WEWN on 7435/7425; 7500 is Thessaloniki's 3rd 35-kW transmitter // 7430 and 9395 (John Babbis, MD) ERT is now participating in European frequency coordination to protect its frequencies better (Demetri H. Vafeas, V. of Greece via Babbis)

**GUAM** KSDA is testing 9530 for Australia until June 24 including *Wavescan* on Sun (Adrian Peterson, AWR) At 0900-1000 off back lobe (Arthur Cushen, *RNMN* and *RNZI Mailbox*)

**GUATEMALA** Cousin in Guatemala City, says mail delivery there is almost nonexistent (Wendel Craighead, KS, *FT*) By the way, the PO says US "G" stamps have been accepted for international mail (gh) International postal rates from the U.S. go up June 1 to 60¢ per half-ounce for letters outside North America (Jim Moats, Diane Mauer)

No-data thank-you letter from R. Coatán, 4780, received from Domingo Hernández, Director; started Oct. 8, 1994, and setup looks modest; call is TGCT, 1 kW, sked seems to be 2330-2400 in K'Anjobal, 0000-0200 in Chuj, 1100-1300 in unspecified language (Jerry Berg, MA, *Fine Tuning*)

90-meter outlets fun to listen to for unusual music—3324, R.



Maya 0030-0100 with Spanish guitar; 3360, La Voz de Nahualá, 0030-0100 Guatemalan salsa, old-fashioned silent-movie soundtrack; 3370, R. Tezulutlán, marimba 0015-0115; 3380, R. Chortís, 0000-0200 with more contemporary music than the others (Barry E. Hlucan, TX, W.O.R.)

**GUINEA** RTVG on 4910 ex-4900 around 1930 (Godfrey Clemitson, South Africa, DSWCI SW News)

**HONDURAS** R. Albatross International, via HRJA, 15675, Sun 2000-2100 includes *Mad Pad*, *Pirate Bag*, *Albatross DX*. Is produced by native Cleveland Mikell Goetsch; sells T-shirt, sweatshirt, listener club membership; order blank from P.O. Box 609338, Cleveland OH 44109 (RAI) Graphic is from *Pirate Bag*.

La Voz de la Mosquitia, 4910.57, had English religion at 0237-0251 on a UT Sat (Brian Alexander, PA) Radio Luz y Vida, 3249, IDed in English at 0355 UT Mon as HRPC, Honduran Radio Proclaiming Christ, in San Luis, but address P.O. Box 303, San Pedro Sula (Barry E. Hlucan, TX)

**ICELAND** RUV good on new 5060 at 1911-1924 //11402 (Carlos Gonçalves, Portugal, DSWCI)

**INDONESIA** GEC-Marconi will supply VOI with three 250 kW SW transmitters, five curtain antennas for enhanced coverage (Marconi via BBCM)

**IRAN** [non] VIRI adds more languages; Hausa, Malay, Dari, Uzbek, Tajik are broadcast from studios and transmitters in Mashhad, Korasan province, 0130-0330, 1430-1630 on 7180, 6175 (BBCM) Should qualify as a separate "station" from Tehran (gh) Heckler on 9023 AM talked about AIDS, pigs, during English from Tehran on 9022 around 2015 (Jeff Richardson, DE)

[non] V. of Mojahed (Crusader) from 0449 jumped around from 5440 to 5460, 5450, 5470 as bubble jamming followed (Rich McVicar, HCJB DXPL)

**ISRAEL** Protest campaign is giving IBA a lot of trouble with the government and management is becoming very defensive. Strategy is to say the whole thing is orchestrated by overseas service staff, citing instances where listeners were asked to write complaining. They are not [sic-context would indicate now] talking about firing many overseas service staff for plotting against the management. So they will now try to fire tenured staff for insubordination. I hope the politicians have the sense to see through the IBA management's defense (Jeff Cohen, WRN via Daniel Rosenzweig, USENET via Thurman, early February) A month later, March plenum meeting attempted to bury the shortwave issue, calling it a dead medium, and blamed the *Calling All Listeners* staff for stirring up protests (*Jerusalem Post* via USENET via Thurman)

**KASHMIR** V. of Kashmir Freedom, opposed to Indian control, believed from Pakistan, heard again at 0230-0330 on 5750 AM, and on 5750 and 5300 USB, two or three frequencies at once and not always in parallel. Urdu ID is *Sada-i Hurriyat-i Kashmir*, but also in Kashmiri and English, also at 1430-1530 and unconfirmed at 0700, 1100, 1630. Gives address of P.O. Box 102, Muzaffarabad, Azad Kashmir, via Pakistan. Opens with Koran (BBCM)

**KURDISTAN** V. of Islam, V. of the Islamic Movement in Iraqi Kurdistan, heard again in January after a year's absence, in Kurdish and Arabic at 1330-1500, repeated at 0430-0600 on variable 6285, 4400, 4110; ID in Arabic: *Sawt al Islam*, *Sawt al Harakah al Islamiyah fi Kurdistan al-Iraq* (BBCM)

**KUWAIT** Starting in Feb for Ramadan, R. Kuwait on new 11675 in 1800-2300\* period, Arabic, mixing with English on 11990 to produce spurs on 12305, 11360; also Arabic crosstalk on 11990 (Brian Alexander, PA, W.O.R.)

**LAOS** Luang Prabang heard on 6970, as in years past, tho more



recently was around 7162 (BBCM)

**MEXICO** R. México International, XERMX on 10388v, terribly distorted FM carrier, 0100-0232 when finally heard ID (Chris Lobdell, MA, *Jihad-DX* via *Tropical Tuning* via Thurman) RMI heard on 9705 at 1517, very poor and faded away (unknown reporter to FT) Weak but audible after an absence on 9705 at 0158-0212 (Ron Trotto, IL, W.O.R.) Weeknights with *Antena Radio* newscast in Spanish 0100-0200 on 9705 (gh)

Two clandestines share one common setup—La Voz de Guatemala Mayán, and La Voz de Chiapas Libre. They broadcast in three Mayan dialects, Spanish, and have an English cassette with QSL info, ID. Likely to be heard between 7400 and 7500; I urged them to check both 7415 and 7465 each  $\pm 5$  kHz and select whichever was clearest; their AM and tropical band outlets are not expected to be audible outside Mexico. Before *Federales* overran the area, was located near Comitán, Chiapas. Basically they are using modified California ham gear bought at a swap meet. I have QSLed four receptions, from Bay Islands of Honduras, Cancún-Cozumel area, Cayman Islands, and Key West (Jay Murley, via Robert Steepy, NJ W.O.R.) R. Rebelde, Chiapas mobile, needs donations of production equipment for planned SW; contact at 601 N. Cotton, A-103, El Paso, TX; or 5711 Harrisburg Blvd, Houston TX 77011 (via Bruce Girard, Internet via HCJB DXPL) Same station?



Radio Moldova International  
str. Miorita 1 Chisinau 277028  
Republica Moldova



**MOLDOVA** Due to lack of reception reports and need to improve frequency usage via Romania, we invite reports of R. Moldova International, with 2 IRCs appreciated, to: RMI Monitoring Action, P.O. Box 9972, Chi in u 70, Moldova 277070 (Leonid D. Cultuclu, Chairman) Previously published schedule expired March 26.

**MONACO** TWR's only English is now at 0640-0820 (Sat 0805) on 7115, still via Monte Carlo; see also ALBANIA (via Paul Brems SW Echo via Thurman)

**MYANMAR** Altho first heard in 1987, Defence Forces Broadcasting Unit, 6570, finally QSLed after 8th try; says 10 kW with inverted cone antenna; heard at 1030-1330 (Nobuyoshi Aoi, R. Japan *Media Roundup*)

**NORWAY** R. Norway Z-95 for Americas 2200/0430 uses 9485, 7480, 7445 (Joe Hanlon, PA)

**PALAU** KHBN building two new transmitters, expected on air by Easter, for Japan, Australia/NZ, N. Korea; also needs to get replacements for other transmitters obtained from HCJB, now 35 years old, expensive to maintain and upgrade (George Otis, High Adventure, HCJB DXPL)

**PERU** R. Chanchamayo reactivated on 4895, heard before 1100, but afterwards Colombian La Voz del Río Arauca, also reactivated (Henrik Klemetz, Colombia, W.O.R.)

**PHILIPPINES** DZB2, Mindoro now on listed 3345, 2230-2302\* in Tagalog (Roland Schulze, Philippines, DSWCI SW News)

**PORTUGAL** R. Portugal had delightful hour of music 2230 on 9570;

## DX Listening Digest

More broadcasting information by country compiled  
by Glenn Hauser

## Review of International Broadcasting

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Glenn Hauser, Box 1684-MT, Enid, OK 73702

I just relaxed and listened, on a Sunday (Gigi Lytle, TX)

**SAIPAN** W-94 schedule for KFBS showed English only on Wed and Sat 1830-1900 on 5810 (via Doug Dine via Diana Mauer)

**SÃO TOME** Contrary to item from another VOA spokesman here in March, (gh) VOA relay will not be on SW until around December (Dan Ferguson, VOA, NU via NASWA Journal)

**SOMALIA** R. Free Somalia has 15 min of English on 3920 in broadcasts at 1000-1215, 1600-1715; in Somali 1230-1300 on 13820, says Sam Voron (Dieter Neiburg, Germany, HCJB TLC) Answering your question in Feb, there are two different Somali stations on 6810 USB and 6870 USB run by two different political groups, both called "R. Mogadishu;" 6870 is more regular (Harald Kuhl, Germany)

**SRI LANKA** India, which strongly objected to the VOA building a new relay station here, has now withdrawn its opposition (*The Pioneer*, New Delhi, via BBCM) Now that its future is in doubt, as reported here previously; thanks a lot! (gh)

**SWEDEN** Like SBC, R. Sweden must undergo an 11% budget cut, about 4 megacrowns, by 1998. R. Sweden intends not to abolish any branch of operations, will do everything to preserve service existing today, in substance; may not use all transmitters at same time, reduce hours, change format and length of programs (Hans Wachholz, R. Sweden, via BBCM) Z-95 English to Americas: at 1230 and 1330 on 11650, 15240; at 0030 on 6065, 9810, 0230; at 0330 on 7120, 9850 (via Joe Hanlon, PA)

**TAIWAN** [non] VOFC via WYFR for Z-95 to Europe at 2200-2300 on 17750, 21720 (WYFR) Really audible in Europe at midnight? (gh)

**TAJIKISTAN** [non?] V. of Free Tajikistan (Tajik: *Sado-i Tajikistan-i Ozod*), supporting various opposition groups based in Afghanistan such as the Islamic Rebirth Party; also IDs as "the Messenger of Khorasan" (Tajik: *Payk-i Khorasan*; Khorasan is the Central Asian region once inhabited by Tajiks and Persians), times and duration varies, about 40 minutes at 0300, 0600, 0900, 1100 confirmed on 7080 (varying 7030-7090), also announced on 6875, 6890; in Tajik but in past also in Russian (BBCM)

**TURKEY** VOT plans to have five new 500 kW SW transmitters on air in June (George Poppin via Joe Hanlon) Already using 500 kW on 9445 to us, with poor reception in central N. America; rather than brute force, they need a different strategy, such as Caribbean relays. For programs, see SWG pages (gh) Suggested possible new freqs 6015, 6035, 7295. (Robert Ellis, CIDX)

**UKOGBANI** Bessemer Broadcasting, Sheffield, has 12-month test license for G9CDP on 2404.5 kHz AM, very low power testing various aerials with music, announcements (British DX Club *Communication*) One watt (FT)

**BBC Worldwide** now printed and mailed from U.S. to improve distribution; P.O. Box 3000, Denville, NJ 07834; phone 201-627-2427; fax 201-627-5872 (David Alpert, USENET via Thurman)

**USA** In mid-March, the first of the three ABB transmitters was removed from VOA-Bethany, indeed a sad day (John Vodenik, OH) Then all three transmitters stripped for shipping to Sri Lanka, sealed to keep water out; remaining three staff and I were to depart April 17 (Vodenik, HCJB DXPL) Dial-up VOA programming at 202-619-1979 (RNMN)

**KGEL**, V. of Friendship to be reborn under new ownership near Twin Falls, ID, as FEBC donated 250-kW transmitter to Calvary Chapel; will resume broadcasting in Spanish to Mexico (*The Broadcaster*, FEBC via Gigi Lytle)

How many transmitters at WYFR, Okeechobee, FL? Frequency schedules now enumerate them—12 x 100 kW and 2 x 50 kW. For Z-95,

former WEWN channel 9985 is used by WYFR, 0300-0745 in Russian, English; likewise 15695 at 1545-2245 in German, Italian, French, Spanish (gh)

WEWN has new 26-week anti-abortion series *Life Issues* with Fr. Frank Pavone, Priests for Life, Sun 1730 on 9455, Wed 0200 on 7425, Wed 0600 on 7425, Thu 2330 on 7425, Sat 1600 on 9455, Sun 0300 on 7425 (*Gabriel's Horn* via Diane Mauer) As of March; maybe one UT hour earlier and some different frequencies now.

*The Big Beat!*—latest reissues of blues, R&B, doo-wop, rockabilly and other roots music, is on WHRI, 5745, UT Suns 0430; listeners reach us via Internet: [bigbeat1@delphi.com](mailto:bigbeat1@delphi.com) (*The Big Beat!*) see also ETHIOPIA

WINB on new 11790 Sun 1230-1350 replaying call-in on Montana Militia (Martin Gallas, IL) Z-95 authorizations: 1100-1400 on 11790, 1400-2400 on 15715, 0000-1100 on 11950 (George Jacobs & Associates)

KVOH, Rancho Simi, CA, Z-95: 1200-2400 on 17775; 0000; 0000-0700 on 9785 or alternate 7415 (George Jacobs & Associates)

In addition to caps, WRMI sells T-shirts, blue with logo for \$15, size L or XL (*Viva Miami*)

Ross Perot stops *Listening to America* in June (Howard Kurtz, *Washington Post* via Chet Copeland) Until then, check WRNO UT Mon 0006 on 7355 (gh)

New on WWC: *Best of Memphis*, country music with Ed Towns, Mon 1715 on 12160; *Nashville Songwriters' Night*, Sun 2200 on 12160 (Adam Lock, WWC)

**WORLD OF RADIO** on WWC: Fri 2030 on 12160, 2115 on 9475 (June and July back on 15685), Sun 0500 on 7435, 0930 on 5065, 2300 on 9475, Tue 1230 on 15685; on WHRI: Fri 2101 on 13760, Sat 0601 on 7315, 9495, 1729 on 13760, 15105; on KWH: Sat 1729 on 6120, Mon 0330 on 17510.

**VANUATU** R. Vanuatu activated new 10 kW transmitters Feb 24 (Chris Hambly, Australia, W.O.R.) A big help, heard for first time on 7260 at 0940-1025 in English, C&W, ship skeds in Pidgin, 1000 ID, news (Ed Rausch, NJ, HCJB TLC)

**VENEZUELA** La Voz de la Fé, Maracaibo, planned to reactivate 3375 with Catholic programming to counter all the evangelical/Protestants on Ecos del Torbes, R. Táchira, and others (Manuel Rodríguez Lanza, *Tropical Tuning* via Thurman)

**VIETNAM** [non] V. of Russia replaced 7400 with 9820 in March, now buried under Cuba, probably including VOV relay at 0600-0700 (Kevin Hecht, PA)

**WESTERN SAHARA** [non] National Radio of the Saharan Arab Democratic Republic, tentatively on 11610 in Arabic, rustic music, 1845-2301\* (Brian Alexander, PA) This Polisario Front station back on new 11610 at 1800-2400 in Arabic, ex-11800, 11320, 11520; also on MW 1544 ex-1355 which is believed from Tindouf, Algeria. Also unconfirmed on both irregularly at 0000-0100 in Spanish; Arabic 0600-0800 except Fridays 0700-0900. And Voice of Free Sahara again heard via Algiers, 2200-2300 on 9640 and 15215 in Arabic, Spanish (BBCM)

**YEMEN** Republic of Yemen Radio again with English 1800-1900 on 9780.3 with news at 1800, 1830; Elton John pops; stronger than Portugal 9780.0 (Brian Alexander, PA, W.O.R.)

**ZAIRE** R. Bukavu on 9696, French at 1722-1730 (Godfrey Clemiston, RSA, DSWCI, SW News) 2 x 4848? (gh)

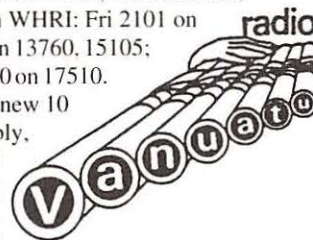
**ZAMBIA** Christian Voice heard testing on 4965 at 0423-0450+, asking for reports (Sheryl Paszkiewicz, WI, TLC) Later QSL from Andrew Flynn says 1300-1500 on 6065, 1500-2030\* on 4965 (Rich McVicar, *ibid.*)

*Until the next, Best of DX and 73 de Glenn!*

### VOICE OF FREE CHINA



自由中國之聲



# Broadcast Loggings

Gayle Van Horn

## SHORTWAVE BROADCASTING

### 0000 UTC on 6055

SPAIN: Radio Exterior España. Spanish. Station sign-on with time pips and ID. News and program features. (Sue Wilden, Columbus, IN) *Window on Spain* heard in English on 9540 at 0028. (Bob Fraser, Cohasset, MA)

### 0010 UTC on 6110

UNITED STATES: Voice of America. *Agriculture Today* show featuring new books, China's demands on world agriculture and world food demands by 2000. VOA noted on 17726 at 2123. (Gerry Le Strange, East Brunswick, NJ) Noted at 0100 on 11695. (Wilden, IN)

### 0056 UTC on 5975

UNITED KINGDOM: BBC. *The Learning World* program on //5965. World Service also noted on 5990 at 1500. (Gerald R. Brookman, Kenai, AK) Short story - *The Admiral Flew at Low Altitude* heard on 11650 at 1441. (Fraser, MA)

### 0059 UTC on 9645

ITALY: RAI. News item on the *Festival of Two Worlds*. ID noted as "Rye International." *Hello Italy* on seaside resorts heard on 9575 at 1947. (Fraser, MA)

### 0115 UTC on 3250

HONDURAS: Luz y Vida. Spanish. Regional news to 0150. Tentative logging on 4930 at 0545 as Honduran *Radio International*. (Sam Wright, Biloxi, MS)

### 0105 UTC on 6165

NETHERLANDS: Radio Netherlands. *Sounds Interesting* program, featuring current affairs from Amsterdam and Zeeland. (Le Strange, NJ)

### 0200 UTC on 9475

EGYPT: Radio Cairo. Holy Koran recitations with poor signal quality. International news noted at 1500 on 9900 into Egyptian music program. (Frank Hillton, Charleston, SC)

### 0204 UTC on 7435

UNITED STATES: WWCN. Ken Berryhill presents *Old Record Shop*, a feature of Big Band music. Great tunes from Tommy Dorsey, Mills Brothers and Buddy Clark. (Le Strange, NJ)

### 0229 UTC on 6185

MEXICO: Radio Educación. Spanish/English. Multilingual IDs and mailing address for listeners. Mexican ranchero music. (W.L. Alexander, Columbus, OH) Mexico's *Radio Huayacocotla* heard weakly on 2390 at 1240. Presumed regional announcements to campesino music. (Hillton, SC)

### 0256 UTC on 4830

BOTSWANA: Radio Botswana. Distinctive cowbell/farm animal interval signal. Station ID and upcoming program preview before brief newscast. -ed.

### 0300 UTC on 9860

NETHERLANDS: Radio Netherlands. *Media Network* program. Discussion on current movies on 13700 at 1353. (Brookman, AK) *Happy Station* on 17605 at 1935. (Wright, MS)

### 0350 UTC on 0350

MOZAMBIQUE: Radio Mocambique. Portuguese. Fair signal for a program of Portuguese pops and African highlife tunes. Time signal gong at the hour into ID and world newscast. -ed.

### 0400 UTC on 4976

UGANDA: Radio Uganda. Very weak signal for station's anthem sign-on and ID. Recheck for afternoon pops at 2058 with presumed sign-off routine in progress, dropping out by 2100. (Don Taylor, Green Cove Springs, FL)

### 0410 UTC on 4955

COLOMBIA: Radio Nacional de Colombia. Spanish. Good signal for Latin music program. Station ID given as, "emisora Nacional de Colombia buena musica." (Wright, MS)

### 0419 UTC on 2460

BRAZIL: Radio Alvorada. Portuguese. Easy-listening pop vocals to 0430 ID. (Frodge, MI) Brazil's *Radio Clube* on 3374 at 0530 with local ads and Braz pops. (Taylor, FL)

### 0501 UTC on 15240

AUSTRALIA: Radio Australia. Sports update into newscast. // 15365, 15415, 13605. Feature on Hawaii at 2353 on 17795//17860, 15240. (Brookman, AK)

### 0520 UTC on 9580

GABON: Afrique Numero Un. French. West African music to ID at 0530. Monitored at 1725 on 15475 with similar programming, news briefs. (Wright, MS)

### 0557 UTC on 4830

VENEZUELA: Radio Tachira. Spanish. Station's sign-on of choral anthem, covering Costa Rica's *Radio Reloj* on 4833. Station ID/frequency quote into news and information. (Frodge, MI)

### 1032 UTC on 3220

ECUADOR: HCJB. Andean vocals to announcer's commentary on continued border disputes with Perú. Parallel program on 6080 with SIO=333. (Frodge, MI) *Morning in the Mountains* heard on 12005 at 2200. (Fraser, MA)

### 1045 UTC on 3340

PERU: Radio Altura. Spanish. Lite pops to frequency quote and "Radio Altura" ID. Tentative ID for *Radio Mundo Perú* on 5084 at 1045. (Frodge, MI)

### 1052 UTC on 3370

GUATEMALA: Radio Tezulutlán. Spanish. Programming intros to marimba music program. Regional language for sermon text. Guatemala's *Radio Chortis* noted in Spanish on 3380 at 1145. (Frodge, MI)

### 1100 UTC on 9530

SINGAPORE: Radio Singapore Int'l. Announcer duo's news in brief interspersed with bumper music. Audio hum interference on 9525. (Frodge, MI)

### 1140 UTC on 9580

AUSTRALIA: Radio Australia. Report on polymer banknotes to foil counterfeiters. (Fraser, MA) Chinese service on 6080//6060 at 1404. (Frodge, MI) English noted at 1527-1535 on 6080//6060, 5995, 9710, 11695, 11800. (Brookman, AK)

### 1220 UTC on 11615

FRANCE: Radio France Int'l. Report and interview with Chinese engineer. (Fraser, MA) France's Gabon relay noted on 7160 at 2050. Afro pops to news at 2100. (Frodge, MI)

### 1343 UTC on 15240

SWEDEN: Radio Sweden. Feature on Swedish aid to Palestine. (Brookman, AK) *Sixty Degrees North* program heard on 11650 at 1441. (Wilden, IN)

### 1430 UTC on 17595

MOROCCO: RTV Marocaine. Closing news items to station ID and U.S. pop music program. (Wright, MS)

### 1450 UTC on 9560

ETHIOPIA: Radio Ethiopia. Arabic. Talk and regional music rhythms. Arabic service sign-off at 1459, commencing with English service at 1500. Interval signal, ID and brief newscast. (Bob Hanson, Atlanta, GA)

### 1525 UTC on 15415

LIBYA: Radio Jamahiriya. Arabic. Radio drama heard on //15235 with fair signal quality. (Wright, MS)

### 1553 UTC on 9560

JORDAN: Radio Jordan. DJ's 50's oldies show. ID "this is Radio Jordan broadcasting from Amman," into 1600 world newscast. (Frodge, MI; Hanson, GA)

### 1737 UTC on 9760

PORTUGAL: Voice of America relay. *Issues in the News* moderated by Martin Schram, with discussion of US foreign policy and budget cuts. Poor signal. (Jim Moats, Ravenna, OH)

### 1739 UTC on 15050

COSTA RICA: RFPI. *Fire* program in progress at tune-in, with features on contemporary women's issues. Fair to good signal. (Moats, OH) Costa Rica's *AWR* noted on 5030 at 1030 with religious text. (Frodge, MI; Brookman, AK)

### 1800 UTC on 9420

CZECH REP.: Radio Prague. Station ID and news bulletin into *Live in Prague* show, recorded in a Prague jazz night club at 1805. Fair signal. (Moats, OH)

### 1800 UTC on 11715

ALGERIA: Radio Algiers Int'l. Station sign-on with station ID/frequency quote. Address for listeners to world newscast. Music show of Arabic, R&B and US pop tunes. (Hanson, GA)

### 1830 UTC on 11990

KUWAIT: Radio Kuwait. Time pips and station ID, into regional news bulletin. Koran lesson at 1845. *Pop Session Special* at 1900, a program of contemporary hit music. Fair signal quality. (Moats, OH)

### 1832 UTC on 17830

ASCENSION ISLAND: BBC relay. *From Our Own Correspondent* in progress reporting on U.S. Republican presidential candidates. (Moats, OH)

### 1931 UTC on 9465

RWANDA: Deutsche Welle. *Insight* program with report on the 50th anniversary observance of the allied bombing of Dresden, Germany. Closing program announcements with fair signal quality. (Moats, OH)

### 2000 UTC on 15110

MAL: China Radio Int'l relay. Interval signal and ID into world news bulletin. Program analysis of the Bosnian conflict at 2010. Fair-good signal. (Moats, OH; Fraser, MA)

### 2118 UTC on 11720

CUBA: Radio Havana. Report on Jesse Helm's new proposal to increase the U.S. blockade of Cuba. (Fraser, MA)

### 2135 UTC on 9550

RUSSIA: Voice of Russia. *Culture & the Arts* - the Heritage Museum to feature German art captured by the Red Army in WW II. *Science & Engineering* show on 7150 at 2250. (Fraser, MA; Wilden, IN; Frodge, MI)

### 2142 UTC on 18710

UNITED STATES: Monitor Radio Int'l. Political talk and interviews. (Le Strange, NJ) Additional monitoring at 0335 on 5850. (Brookman, AK)

### 2145 UTC on 9620

MOLDOVA: Radio Dniester Int'l. Good signal for features and Russian folk music. (Banks, TX)

### 2205 UTC on 9700

BULGARIA: Radio Bulgaria. Report on Bulgarian/Albanian relations. (Rick Mercer, Orlando, FL)

### 2240 UTC on 4870

BENIN: ORTB. French. R&B vocals to French Afro music. Announcer's station ID as, "ici Radiodiffusion Benin." National anthem to 2300". (Mercer, FL)

### 2300 UTC on 5960

CANADA: Radio Canada Int'l. *The World at Six* discusses Canadian government views on military hazing scandals. (Fraser, MA; Wilden, IN; Mercer, FL)

### 2314 UTC on 11700

NORTH KOREA: Radio Pyongyang. English announcer's commentary on Kim Il Sung and Kim Jung Il // 13650. (Frodge, MI) Sign-on at 0000 with greetings to Dear Leader on 13760//17835 (Brookman, AK)

### 2318 UTC on 9445

TURKEY: Voice of Turkey. *Letterbox* program discussing religious holidays and practices. (Tom Banks, Dallas, TX)

### 2325 UTC on 4820

HONDURAS: La Voz Evangelica. Spanish. Religious hymns of fair signal quality. Sermon text to ID at 0100. (Wright, MS) Monitored past 0230. (Alexander, OH)

Thanks to our contributors — Have you sent in YOUR logs?  
Send to Gayle Van Horn, c/o Monitoring Times.  
English broadcast unless otherwise noted.

### Been There . . . Got a T-Shirt!

One of the fun things about QSLing is receiving the station souvenirs—just ask Philadelphia's DXer, Walter Szczepaniak! Walter received a free T-shirt from CFCX in Montreal, plus a lapel pin and station stickers.

These "goodies" that stations provide include tourist brochures, magazines, colorful pennants, newspapers, key chains, stamps, as well as a complimentary program schedule. In your next report, why not ask for any souvenirs that might be available?

Eric Walton of Vancouver reports that Radio Denmark now sends out a full-data QSL card for reporters sending a complete reception report if 1 IRC or 1 U.S. dollar is enclosed. Radio Denmark is also considering English programming if enough listeners write to warrant the new service. Please send your support and comments to; Radio Denmark, Rosenorns Alle 22, DK-1999 Frederiksberg C, Denmark. E-mail via Internet: rdk.ek@login.dknet.dk. Fax: +45 35 20 57 81. Ph. Rec.: +45 35 20 57 91.

#### AIRCRAFT TRAFFIC

DOOM 81, (B-52H) Tail # 60-0059) 1176 kHz USB. Full data prepared QSL card verified. Personal letter from pilot and 96th Bomber Squadron patch enclosed. Received in 47 days for an English utility report. QSL address: Barksdale AFB, Shreveport, LA 71110. (Steve McDonald, Port Coquitlam, BC Canada).

REACH 92, (KC-135R) 92nd Air Refueling Squadron (Tail # 64-4831) 11176 kHz USB. Full data prepared QSL card verified. Received in 38 days for an English utility report. QSL address: Fairchild AFB, Spokane, WA 99011. (McDonald, CAN)

#### ANTIGUA

Deutsche Welle Relay, 6040 kHz. No data 40th Anniversary station card unsigned. Received in 103 days for an English report, 1 IRC, and address label (not used on reply). Original report sent to Antigua address, reply received from German address as: Deutsche Welle, Postfach 10 0444, 50588 Cologne 1, Germany. (Mike Hardester, Jacksonville, NC)

#### AUSTRALIA

VHP-8478 kHz USB. Verification statement on letter, signed by E.M. Doncaster-PORS, Freq. Manager. Received for an English utility report, prepared QSL card (not returned) 1 IRC and address label (used on reply). Station address: NAVCOMSTA Canberra, HMAS Harman, Canberra ACT 2600, Australia. (Hardester, NC)

#### CANADA

CFCX-6005 kHz. Full data QSL certificate unsigned. Station T-shirt with emblazoned station's French logo, lapel pin, and station stickers. Received in 46 days for a French report and programming cassette. Station address: c/o CFCX, Metromedia CMR Inc., 211, Ave. Gordon, Montreal, Quebec, Canada H4G 2R2. (Walter Szczepaniak, Philadelphia, PA)

VCT-8422 kHz USB. Prepared QSL card returned and signed by Robert Glasco-VOIRP. Station cover letter enclosed. Received in 34 days for an English utility report, Canadian mint stamps and address label (used on reply). Station address: Neweast Wireless Telecom, General Delivery, Tors Cove, NFLD Canada AOA 4AO. (Hardester, NC)

#### MEDIUM WAVE

KBOI-670 AM. Full data station verification

letter signed by Willis Frahm-Chief Engineer. Received in 91 days for an English AM report. Station address: 149 West Bannock St., P.O. Box 1280, Boise, ID 83701. Ph:208-336-3670/ Fax:208-336-3734. (Mark Redfox, Seattle, WA)

KKAR-1290 AM. Frequency only letter signed by Allen Sherrill - Chief Engineer for station DX Test. Bumper sticker enclosed. Received for an English AM report and U.S. mint stamps. Station address: 1001 Farman-on-the Mall, Omaha, NE 68102. Ph:402-342-2000/Fax:402-342-5874. (Hardester, NC)

WSVI-910 AM. Two page letter for station DX Test, signed by Dennis Reese-Program Director, plus an Iowa postcard. Received in 16 days for an AM report and an SASE. Station address: 3300 Engineering Bldg., Iowa City, IA 52242-1597. (Herbert Newberry Jr., Mansfield, GA)

U.S. Virgin Islands-WVWI/Radio One, 1000-AM. Full data QSL on station letterhead for station DX Test, signed by Rick Ricardo - Director of Operations. Large station silver/blue sticker enclosed. Received in 18 days for English AM report, and one U.S. dollar. Station address: c/o Thousand Islands Corp., P.O. Box 5678, St. Thomas, U.S. Virgin Islands, 00803-5678. Ph:809-776-1000/Fax:809/776-5357.(Lloyd Van Horn, Brasstown, NC)

WPFJ 1480-AM. Prepared QSL card returned and signed by General Manager, and souvenir glass mug with station logo emblazoned in gold. Received in 15 days for an English report and U.S. mint stamp. Station address: 106 Palmer St., P.O. Box 1335, Franklin, NC 28734. (Van Horn, NC)

St. Kitts-Radio Paradise/Trinity Broadcasting Network, 830-AM. Partial data QSL (frequency/date) on TBN logo card unsigned. Program schedule and religious brochures enclosed. Received in 14 days for an AM report and U.S. mint stamp. Station address: TBN Engineering Dept., 2442 Michelle Dr., Tustin, CA 92680. (additional address as: Box A, Santa Ana, CA 92711. (Randy Stewart, Springfield, MO)

Polson, Montana-KERR 750-AM. Full data pink station logo/QSL sheet for station DX Test, signed by A.L. Anderson - Chief Engineer. Received in 18 days for an English AM report, prepared QSL card (not returned) and U.S. mint stamp (used on reply). QSL address: c/o Anderson Broadcasting Co., KBMR/KQDY, 3500 East Rosser Ave., Bismarck, ND 58501. -ed.

#### SHETLAND ISLANDS

GNK-1 Norwick, 2832.7 kHz USB. Full data QSL signed by Neil Muir. Frequency/station master schedule and two picture postcards enclosed. Received in 164 days for an English utility report. QSL address: 45 Willow Bank, Wick, Caithness, Scotland KW14NZ (McDonald, CAN)

#### SHIP TRAFFIC

USS Mississippi-NGGD, 10493 kHz USB. (Nuclear Guided Missile Cruiser). Full data prepared QSL card verified, letter, and photo of vessel enclosed. Received in 20 days for an English utility report and U.S. mint stamps. Ship QSL address: FPO AE 09578-1167. (Mike Schulsinger, Springfield, OH)

USS Vicksburg-NVMS, 5211 kHz USB (Guided Missile Cruiser). Full data prepared QSL card verified, letter, and ship brochure enclosed. Received in 30 days for an English utility report and U.S. mint stamps. Ship QSL address: FPO AA 34093-1189. (Schulsinger, OH)

Nordbult-P3EC4, 156.65 MHz USB (Bulk Carrier). Full data prepared QSL verified and photo of vessel enclosed. Received in 184 days for an English utility report and one U.S. dollar. Ship QSL address: c/o Telaccount Overseas Ltd., P.O. Box 127, Limassol, Cyprus. (Hank Holbrook, Dunkirk, MD)

Maersk Miami-9VKL, 156.65 MHz USB (Container Vessel). Prepared QSL card returned as verified. Received in 150 days for an English utility report and one U.S. dollar. Ship QSL address: Moller, A.P., Esplanaden 50, DK-1098 Copenhagen, Denmark. (Holbrook, MD)

#### TRAVELERS INFORMATION STATION (TIS)

KPD-581-1620 AM kHz, Windsor, CT. (CT Department of Transportation). Full data prepared QSL card signed by Doug Maine-Manager of Communications. Station address: The Rideshare Co., 108 Charter Oak Ave., Hartford, CT 06106. (Hardester, NC)

#### ZIMBABWE

Zimbabwe Broadcasting Corp., 4828 kHz. Partial-data (frequency/date) large QSL postcard with map logo, illegible signer. Received in 43 days for an English report and one U.S. dollar. Station address: P.O. Box HG 444, Highlands, Harare, Zimbabwe. (Stewart, MO)

## How to Use the Shortwave Guide

## 1: Convert your time to UTC.

Eastern and Pacific Times are already converted to Coordinated Universal Time (UTC) at the top of each page. The rule is: convert your local time to 24-hour format; add (during Daylight Savings Time) 4, 5, 6 or 7 hours for Eastern, Central, Mountain or Pacific Time, respectively.

Note that all dates, as well as times, are in UTC; for example, the BBC's "John Dunn Show" (0030 UTC Sunday) will be heard on Saturday evening (8:30 pm Eastern, 5:30 PM Pacific) in North America, not on Sunday.

## 2: Choose a program or station you want to hear.

Some selected programs appear on the lower half of the page for prime listening hours—space does not permit 24-hour listings except for the "Newsline" listing, which begins on the next page.

Occasionally program listings will be followed by "See X 0000." This information indicates that the program is a rerun, and refers to a previous summary of the program's content. The letter stands for a day of the week, as indicated below, and the four digits represent a time in UTC.

S: Sunday T: Tuesday H: Thursday A: Saturday  
M: Monday W: Wednesday F: Friday

## 3: Find the frequencies for the program or station you want to hear.

Look at the page which corresponds to the time you will be listening. Comprehensive frequency information for English broadcasts can be found at the top half of the page. All frequencies are in kHz.

The frequency listing uses the same day codes as the program listings; if a broadcast is not daily, those day codes will appear before the station

name. Irregular broadcasts are indicated "tent" and programming which includes languages besides English are coded "vl" (various languages).

## 4: Choose the most promising frequencies for the time, location and conditions.

Not all stations can be heard and none all the time on all frequencies. To help you find the most promising frequency, we've included information on the target area of each broadcast. Frequencies beamed toward your area will generally be easier to hear than those beamed elsewhere, even though the latter will often still be audible. Every frequency is followed by one of these target codes:

am: The Americas	as: Asia
na: North America	au: Australia
ca: Central America	pa: Pacific
sa: South America	va: various
eu: Europe	do: domestic broadcast
af: Africa	om: omnidirectional
me: Middle East	

Consult the propagation charts. To further help you find the right frequency, we've included charts at the back of this section which take into account conditions affecting the audibility of shortwave broadcasts. Simply pick out the region in which you live and find the chart for the region in which the station you want to hear is located. The chart indicates the optimum frequencies for a given time in UTC.

## RADIO PROGRAMS

## Sundays

0024 REE: "Distance Unknown"  
0030 VOA (am): "Communications World"  
0030 VOA (ca): "Communications World"  
0109 HCJB: "DX Partyline"  
0124 REE: "Distance Unknown"  
0200 Radio For Peace Int'l: "World of Radio"  
0200 WWCR #1: "Spectrum"  
0200 WWCR #3: "Spectrum"  
0234 RAC: "DXers Unlimited"  
0245 Radio Romania Int'l: "DX Mailbag"  
0258 Vatican Radio: "On-the-Air"  
0315 Voice of Turkey: "DX Corner"  
0350 BBC (eu): "Waveguide"  
0410 Radio Australia: "Feedback"  
0434 RAC: "DXers Unlimited"  
0500 WWCR #1: "World of Radio"  
0507 Vatican Radio: "On-the-Air"  
0509 HCJB: "DX Partyline"  
0524 REE: "Distance Unknown"  
0525 Radio Japan: "Media Roundup"  
0610 Radio Australia: "Feedback"  
0634 RHC: "DXers Unlimited"  
0635 Radio Vlaanderen Int'l: "Radio World"  
0720 Radio Japan: "Media Roundup"  
0810 Radio Australia: "Feedback"  
0835 Radio Korea: "Shortwave Feedback"  
0915 AWR-Europe: "Wavescan"  
0930 WWCR #3: "World of Radio"  
0940 FEBC (Philippines): "DX Report"  
1000 Radio For Peace Int'l: "World of Radio"  
1120 Radio Japan: "Media Roundup"  
1137 Radio Korea: "Shortwave Feedback"  
1145 WRME: "Wavescan"  
1235 Radio Korea: "Shortwave Feedback"  
1235 Radio Vlaanderen Int'l: "Radio World"  
1352 Vatican Radio: "On-the-Air"  
1425 Radio Japan: "Media Roundup"  
1436 Radio Korea: "Shortwave Feedback"  
1635 Radio Korea: "Shortwave Feedback"  
1645 BBC (af): "Waveguide"  
1725 Radio Japan: "Media Roundup"  
1805 Radio Vlaanderen Int'l: "Radio World"  
1935 Radio Korea: "Shortwave Feedback"  
1938 Radio Korea: "Shortwave Feedback"  
2005 BBC (eu): "Waveguide"  
2105 Radio Vlaanderen Int'l: "Radio World"  
2115 AWR-Europe: "Wavescan"  
2125 Radio Japan: "Media Roundup"  
2145 Bulgaria: "Radio Bulgaria Calling"  
2215 AWR-Europe: "Wavescan"

2235 Radio Korea: "Shortwave Feedback"  
2252 Vatican Radio: "On-the-Air"  
2300 KSDA (Guam): "Wavescan"  
2300 Radio For Peace Int'l: "World of Radio"  
2300 WWCR #1: "World of Radio"  
2335 Radio Vlaanderen Int'l: "Radio World"

## Mondays

0108 Deutsche Welle: "DXers World Meeting"  
0125 Radio Japan: "Media Roundup"  
0134 Radio Korea: "Shortwave Feedback"  
0330 KWHR (Hawaii): "World of Radio"  
0430 Radio New Zealand Int'l: "Mailbox"  
0445 Radio Bulgaria: "Radio Bulgaria Calling"  
0620 V. of Med. (Malta): "VOM DX Corner"  
0640 Radio Korea: "Shortwave Feedback"  
0700 Radio For Peace Int'l: "World of Radio"  
0720 V. of Med. (Malta): "VOM DX Corner"  
0945 Radio Bulgaria: "Radio Bulgaria Calling"  
1040 All India Radio: "DX-ers Corner (2/4)"  
1215 Radio Bulgaria: "Radio Bulgaria Calling"  
1420 V. of Med. (Malta): "VOM DX Corner"  
1435 All India Radio: "DX-ers Corner (2/4)"  
1520 V. of Med. (Malta): "VOM DX Corner"  
1840 All India Radio: "DX-ers Corner (2/4)"  
1915 Radio Tallinn: "Radio Estonia DX Prog."  
2130 All India Radio: "DX-ers Corner (2/4)"  
2340 All India Radio: "DX-ers Corner (2/4)"

## Tuesdays

1147 Radio Sweden: "Media Scan"  
1230 WWCR #1: "World of Radio"  
1249 Radio Sweden: "Media Scan"  
1349 Radio Romania: "For Radio Amateurs"  
1349 Radio Sweden: "Media Scan"  
1749 Radio Sweden: "Media Scan"  
1900 Radio For Peace Int'l: "World of Radio"  
1950 Polish Radio: "Polish Radio DX Club"  
2049 Radio Sweden: "Media Scan"  
2136 Radio Havana Cuba: "DXers Unlimited"  
2149 Radio Sweden: "Media Scan"  
2235 Radio Havana Cuba: "DXers Unlimited"

## Wednesdays

0049 Radio Sweden: "Media Scan"  
0135 Radio Havana Cuba: "DXers Unlimited"  
0149 Radio Sweden: "Media Scan"  
0220 RAE Argentina: "DX-ers Special"  
0249 Radio Sweden: "Media Scan"  
0300 Radio For Peace Int'l: "World of Radio"

0335 Radio Havana Cuba: "DXers Unlimited"  
0349 Radio Sweden: "Media Scan"  
0535 Radio Havana Cuba: "DXers Unlimited"  
0700 HCJB: "The Latest Catch"  
0800 HCJB: "Ham Radio Today"  
0930 HCJB: "The Latest Catch"  
1030 HCJB: "Ham Radio Today"  
1044 Radio Prague: "Calling All Listeners"  
1100 Radio For Peace Int'l: "World of Radio"  
1315 FEBC (Philippines): "DX Report"  
1530 BBC (south as): "Waveguide"  
1611 Radio Prague: "Calling All Listeners"  
1711 Radio Prague: "Calling All Listeners"  
1720 Polish Radio: "Polish Radio DX Club"  
1730 HCJB: "Ham Radio Today"  
1800 HCJB: "The Latest Catch"  
1920 RAE Argentina: "DX-ers Special"  
2010 Radio Prague: "Calling All Listeners"

## Thursdays

0014 Radio Prague: "Calling All Listeners"  
0114 Radio Prague: "Calling All Listeners"  
0130 HCJB: "Ham Radio Today"  
0152 VOA: "Media Network"  
0200 HCJB: "The Latest Catch"  
0235 RAE Argentina: "DX-ers Special"  
0314 Radio Prague: "Calling All Listeners"  
0344 Radio Prague: "Calling All Listeners"  
0530 HCJB: "Ham Radio Today"  
0600 HCJB: "The Latest Catch"  
0752 VOA: "Media Network"  
0830 Radio New Zealand Int'l: "Mailbox"  
0953 VOA: "Media Network"  
1124 Deutsche Welle: "DXers World Meeting"  
1152 VOA: "Media Network"  
1220 Polish Radio: "Polish Radio DX Club"  
1353 VOA: "Media Network"  
1552 VOA: "Media Network"  
1752 VOA: "Media Network"  
1952 VOA: "Media Network"

## Fridays

0053 VOA: "Media Network"  
0053 VOA: "Media Network"  
0252 VOA: "Media Network"  
0430 BBC (as pac): "Waveguide"  
0452 VOA: "Media Network"  
1145 Radio Finland: "YLE Media Roundup"  
1230 BBC (am): "Waveguide"  
1245 Radio Finland: "YLE Media Roundup"

1345 Radio Finland: "YLE Media Roundup"  
1446 Radio Portugal: "Radio Portugal DX"  
1845 Bulgaria: "Radio Bulgaria Calling"  
1930 Radio New Zealand Int'l: "Mailbox"  
2016 Radio Portugal: "Radio Portugal DX"  
2030 WWCR #3: "World of Radio"  
2115 WWCR #1: "World of Radio"  
2210 Radio Australia: "Feedback"  
2220 Radio Budapest Int'l: "DX News"  
2345 Bulgaria: "Radio Bulgaria Calling"

## Saturdays

0010 Radio Australia: "Feedback"  
0210 Radio Australia: "Feedback"  
0235 RAE Argentina: "DX-ers Special"  
0246 Radio Portugal: "Radio Portugal DX"  
0400 Radio For Peace Int'l: "World of Radio"  
0600 WHRI: "World of Radio"  
0639 Radio Vlaanderen Int'l: "Radio World"  
0715 BBC (as pac): "Waveguide"  
0715 BBC (south as): "Waveguide"  
0739 HCJB (eu): "DX Partyline"  
0940 FEBC (Philippines): "DX Dial"  
1000 BBC (south as): "Waveguide"  
1009 HCJB: "DX Partyline"  
1030 VOA (as): "Communications World"  
1200 Radio For Peace Int'l: "World of Radio"  
1215 Bulgaria: "Radio Bulgaria Calling"  
1230 VOA (as): "Communications World"  
1245 Voice of Turkey: "DX Corner"  
1311 Radio Vlaanderen Int'l: "Radio World"  
1342 Radio Tashkent: "DX Program"  
1347 Radio Romania Int'l: "DX Mailbag"  
1709 HCJB: "DX Partyline"  
1729 KWHR (Hawaii): "World of Radio"  
1729 WHRI: "World of Radio"  
1730 VOA (af): "Communications World"  
1730 VOA (as): "Communications World"  
1730 VOA (as): "Communications World"  
1730 VOA (me): "Communications World"  
1800 Radio For Peace Int'l: "World of Radio"  
1924 REE: "Distance Unknown"  
1945 Radio Romania Int'l: "DX Mailbag"  
2045 Voice of Turkey: "DX Corner"  
2130 VOA (as): "Communications World"  
2130 VOA (me): "Communications World"  
2136 Radio Havana Cuba: "DXers Unlimited"  
2215 Voice of Turkey: "DX Corner"  
2236 Radio Havana Cuba: "DXers Unlimited"  
2300 KSDA (Guam): "Wavescan"

## MT Monitoring Team

**Gayle Van Horn, Frequency Manager**  
North Carolina

**Dave Datko**  
California

**Next Reporting Deadline**  
May 19, 1995

**Jim Frimmel, Program Manager**  
Texas

**Jacques d'Avignon**  
Propagation Forecasts  
Ontario, Canada

## newsline

*"Newsline" is your guide to news broadcasts on the air. • All broadcasts are world news reports unless followed by an asterisk, which means the broadcast is primarily national news. • All broadcasts are daily unless otherwise noted by the day codes.*

### 0000 UTC

**(8:00 PM EDT, 5:00 PM PDT)**

BBC (am) (Newsdesk)  
BBC (as pac) (Newsdesk)  
BBC (south as)  
Canada (North-Quebec) [S]  
China Radio Int'l  
Monitor Radio Int'l [T-A]  
Radio Australia  
Radio Metropolis [T-A]  
Radio New Zealand Int'l [M-A]  
Radio Prague  
Radio Thailand  
Radio Ukraine Int'l  
Radio Yugoslavia  
Spanish National Radio  
Voice of America (am)  
Voice of America (as)  
Voice of America (ca)  
Voice of Russia  
WHRI [T-A]  
WWCR #1 [T-A]  
WYFR [T-F]  
0003  
Radio Pyongyang  
0010  
China Radio Int'l\*  
Voice of America (ca) [T-A]\*  
0015  
Radio Cairo  
0030  
All India Radio  
Radio Nacional de Venezuela [T-S]  
Radio Netherlands Int'l  
Radio Sweden [T-A]  
Radio Thailand [T-S]  
Voice of America (am) [T-A]  
(Special English)  
Voice of America (as) (Special English)  
Voice of Russia  
0045  
BBC (am)\*  
BBC (south as)\*  
0050  
RAI Italy

### 0100 UTC

**(9:00 PM EDT, 6:00 PM PDT)**

BBC (am) (Newsdesk)  
BBC (as pac)  
BBC (south as) (Newsdesk)  
Canada (North-Quebec)  
Deutsche Welle  
FEBC (Philippines)  
HCJB  
KVOH [W]  
Monitor Radio Int'l [T-A]  
R Slovakia Int'l [A]\*  
R Slovakia Int'l [S/T-F]  
Radio Australia  
Radio Canada Int'l

Radio Havana Cuba [T-S]  
Radio Japan  
Radio Korea  
Radio New Zealand Int'l [M-A]  
Radio Norway Int'l [M]  
Radio Prague  
Radio Yugoslavia  
Spanish National Radio  
Swiss Radio Int'l  
Voice of America (am)  
Voice of America (as)  
Voice of America (ca)  
Voice of Indonesia  
Voice of Russia  
0110  
Radio Australia [M-F]\*  
Radio Japan [A]\*  
0113  
Radio Havana Cuba [T-S]\*  
0130  
Radio Austria Int'l  
Radio Havana Cuba [T-S]  
Radio Netherlands Int'l  
Radio Sweden [T-A]  
Radio Tirana  
Voice of Greece  
Voice of Russia [T-A]  
0152  
Vatican Radio [S]  
0155  
Radio Canada Int'l [T-A]  
Vatican Radio [W/F]  
Voice of Indonesia

### 0200 UTC

**(10:00 PM EDT, 7:00 PM PDT)**

BBC (am) (Newsday)  
BBC (as pac) (Newsday)  
BBC (eu) (Newsday)  
BBC (south as) (Newsday)  
Canada (North-Quebec) [S]  
Deutsche Welle  
Monitor Radio Int'l [T-A]  
Radio Australia  
Radio Budapest  
Radio Canada Int'l  
Radio Havana Cuba [T-S]  
Radio Moldova  
Radio New Zealand Int'l [M-A]  
Radio Romania Int'l  
RAE Argentina [T-A]  
Voice of America (am) [T-A]  
Voice of America (as)  
Voice of Myanmar (Burma)  
Voice of Russia  
WINB [T-A]  
WWCR #3 [T-A]  
0203  
Voice of Free China  
0213  
Radio Havana Cuba [T-S]\*  
0215  
Radio Cairo

Radio Nepal  
0228  
Radio Havana Cuba [S]  
0230  
Radio Austria Int'l  
Radio Havana Cuba [T-A]  
Radio Netherlands Int'l  
Radio Pakistan  
Radio Portugal Int'l [T-A]  
Radio Sweden [T-A]  
Radio Tirana  
Voice of Russia

### 0300 UTC

**(11:00 PM EDT, 8:00 PM PDT)**

BBC (af)  
BBC (am)  
BBC (as pac)  
BBC (eu) [S-F]  
BBC (south as)  
Canada (North-Quebec)  
Channel Africa  
China Radio Int'l  
Deutsche Welle  
KVOH [T/W/H]  
Monitor Radio Int'l [T-A]  
Radio Australia  
Radio Havana Cuba [T-S]  
Radio Japan  
Radio New Zealand Int'l [M-A]  
Radio Prague  
Radio Thailand  
Radio Ukraine Int'l  
Voice of America (af) [A-S]  
Voice of Russia  
Voice of Turkey  
WHRI [T-S]  
WINB [T-A]  
WWCR #3 [T-A]  
0301  
Voice of America (af) [M-F]\*  
0303  
Voice of Free China  
0310  
China Radio Int'l\*  
0313  
Radio Havana Cuba [T-S]\*  
0315  
Radio Cairo  
Voice of Greece [S/H]  
0320  
Radio Philippines [M-A]  
Vatican Radio  
0330  
BBC (eu) [A]  
Radio Budapest  
Radio Dubai  
Radio Havana Cuba [T-S]  
Radio Nacional de Venezuela [T-S]  
Radio Prague  
Radio Sweden [T-A]  
Voice of America (af) [M-F]

(Special English)

Voice of Russia

0340

BBC (af)\*

Voice of Greece

0345

Radio Yerevan

0355

Radio Japan

### 0400 UTC

**(12:00 AM EDT, 9:00 PM PDT)**

BBC (af) (Newsdesk)  
BBC (am) (Newsdesk)  
BBC (as pac)  
BBC (eu) [S-F] (Newsdesk)  
BBC (south as) (Newsdesk)  
Canada (North-Quebec)  
Channel Africa  
China Radio Int'l  
Deutsche Welle  
Monitor Radio Int'l [T-F]  
Radio Australia  
Radio Bulgaria  
Radio Canada Int'l  
Radio Havana Cuba [T-S]  
Radio New Zealand Int'l [A]  
Radio New Zealand Int'l [M-F]\*  
Radio Norway Int'l [S]  
Radio Romania Int'l  
Radio Tanzania  
Swiss Radio Int'l  
Voice of America (af)  
Voice of America (me)  
Voice of Russia  
WHRI [T-A]  
WWCR #1 [T-A]  
ZBC Zimbabwe

0403

Radio Pyongyang

0410

China Radio Int'l\*

0413

Radio Havana Cuba [T-S]\*

0425

RAI Italy

0430

BBC (af)\*

BBC (eu) [A]

Radio Finland

Radio Havana Cuba [T-A]

Radio Netherlands Int'l

Voice of Russia

0431

Voice of America (af) [M-F]\*

### 0500 UTC

**(1:00 AM EDT, 10:00 PM PDT)**

BBC (af) (Newsday)  
BBC (am) (Newsday)  
BBC (as pac) (Newsday)  
BBC (eu) (Newsday)  
BBC (south as)

Canada (North-Quebec)

Channel Africa

China Radio Int'l

Deutsche Welle

HCJB

Monitor Radio Int'l [T-F]

Radio Australia

Radio Cameroon

Radio Canada Int'l [M-F]

Radio Havana Cuba [T-S]

Radio Japan

Radio New Zealand Int'l [S-F]

Spanish National Radio

Swiss Radio Int'l (eu)

Vatican Radio [T/F]

Voice of America (af)

Voice of America (me)

Voice of Israel

Voice of Russia

WHRI [A]

0510

China Radio Int'l\*

Radio Australia [M-F]\*

0513

Radio Havana Cuba [T-S]\*

0530

BBC (af)\*

Radio Austria Int'l

Radio Havana Cuba [T-A]

Radio Romania Int'l

Voice of Nigeria

Voice of Russia

0555

Radio Japan [A]

### 0600 UTC

**(2:00 AM EDT, 11:00 PM PDT)**

BBC (af)  
BBC (am)  
BBC (as pac)  
BBC (eu)  
BBC (south as)  
Canada (North-Quebec)  
Deutsche Welle  
Monitor Radio Int'l [T-F]  
Radio Australia  
Radio Havana Cuba [T-S]  
Radio Japan  
Radio Korea  
Radio New Zealand Int'l [M-A]  
Radio Norway Int'l [S]  
Radio Prague  
Radio Yemen  
Swiss Radio Int'l  
Swiss Radio Int'l (eu)  
Voice of America (af) [A-S]  
Voice of America (me)  
Voice of Kenya  
Voice of Malaysia  
Voice of Russia  
WWCR #3 [S]  
0601  
Voice of America (af) [M-F]\*

0603

Radio Pyongyang

0613

Radio Havana Cuba [T-S]\*

0628

Radio Havana Cuba [S]

0630

BBC (af)\*

Radio Austria Int'l [T-S]

Radio Havana Cuba [T-A]

Radio Vlaanderen Int'l

Radio Yemen

Vatican Radio [H]

Voice of Nigeria [M-F]

Voice of Russia

0632

Radio Romania Int'l

0645

Radio Romania Int'l

Voice of Nigeria [M-F]\*

0655

Voice of Med. (Malta) [M-F]

0657

AWR Latin America [F]\*

0700 UTC

(3:00 AM EDT, 12:00 AM PDT)

BBC (af)

BBC (am)

BBC (as pac)

BBC (eu)

BBC (south as)

Monitor Radio Int'l [T-F]

Papua New Guinea

Radio Australia

Radio Japan

Radio New Zealand Int'l [A-S]

Radio New Zealand Int'l [M-F]\*

Voice of Myanmar (Burma)

Voice of Russia

0703

Radio Pyongyang

Voice of Free China

0710

Radio Australia [M-F]\*

0730

HCJB

Radio Austria Int'l [T-S]

Radio Netherlands Int'l

Radio Pakistan

Radio Prague

Vatican Radio [M-F]

Voice of Greece [S/H]

Voice of Russia [M-A]

0745

Radio Finland

0750

Radio New Zealand Int'l [M-F]\*

Russia (Radio Pacific Ocean)

[A]

0755

Radio Japan

Voice of Med. (Malta) [M-F]

0800 UTC

(4:00 AM EDT, 1:00 AM PDT)

BBC (af)

BBC (am)

BBC (as pac)

BBC (eu)

BBC (south as)

KNLS

Monitor Radio Int'l [M-A]

Radio Australia

Radio Finland

Radio Korea

Radio New Zealand Int'l

Radio Pakistan

Voice of Indonesia [A-H]

Voice of Malaysia

Voice of Russia

0803

Radio Pyongyang

0810

Radio New Zealand Int'l [M-F]\*

0830

R Slovakia Int'l

Radio Netherlands Int'l

Radio Yerevan [S]

Voice of Russia

0855

Voice of Indonesia [A-H]

0900 UTC

(5:00 AM EDT, 2:00 AM PDT)

BBC (af)

BBC (am)

BBC (as pac)

BBC (eu)

BBC (south as)

China Radio Int'l

Deutsche Welle

Monitor Radio Int'l [M-A]

Papua New Guinea [M]\*

Radio Australia

Radio Bulgaria

Radio Japan

Radio New Zealand Int'l [M-A]

Radio Vlaanderen Int'l [M-A]

Swiss Radio Int'l

Voice of Russia

WWCR #3 [A]

0910

China Radio Int'l\*

Radio Australia [M-F]\*

0920

Voice of Greece [S/H]

0930

[S]

FEBC (Philippines)

Radio Austria Int'l [M-A]

Radio Netherlands Int'l

Voice of Russia

0940

Voice of Greece

0945

Deutsche Welle [M-F]\*

0955

Radio Japan

1000 UTC

(6:00 AM EDT, 3:00 AM PDT)

All India Radio

BBC (af) (Newsdesk)

BBC (am) (Newsdesk)

BBC (as pac) (Newsdesk)

BBC (eu) (Newsdesk)

China Radio Int'l

FEBC (Philippines) [M-F]\*

HCJB

Monitor Radio Int'l

Papua New Guinea

Radio Australia

Radio New Zealand Int'l [S-F]

Radio Tanzania

Swiss Radio Int'l (eu)

Voice of America (as)

Voice of America (ca)

Voice of Kenya

Voice of Russia

1010

China Radio Int'l\*

Radio New Zealand Int'l [M-F]\*

1020

Vatican Radio [M-A]

1030

Radio Dubai

Radio Netherlands Int'l

Radio Prague

Voice of Nigeria

Voice of Russia

1045

Radio New Zealand Int'l [M-F]\*

Voice of Nigeria [A-S]\*

1100 UTC

(7:00 AM EDT, 4:00 AM PDT)

BBC (af) (Newsdesk)

BBC (am) (Newsdesk)

BBC (as pac) (Newsdesk)

BBC (eu) (Newsdesk)

BBC (south as) [H-T]

(Newsdesk)

Deutsche Welle

Monitor Radio Int'l [M-A]

Papua New Guinea

Radio Australia

Radio Ghana [A-S]

Radio Japan

Radio Jordan

Radio Mozambique

Radio New Zealand Int'l

(Newsdesk)

Radio Pakistan

Radio Singapore Int'l

Swiss Radio Int'l

Swiss Radio Int'l (eu)

Voice of America (as)

Voice of America (ca)

Voice of Israel

Voice of Russia

WHRI [A]

WWCR #1 [M-F]

WYFR [M-A]

1103

Radio Pyongyang

1110

Radio Australia\*

1130

Radio Austria Int'l

Radio Bulgaria

Radio Finland [M-A]

Radio Korea

Radio Nacional de Venezuela

[M-A]

Radio Netherlands Int'l

Radio Singapore Int'l

Radio Sweden [M-F]

Voice of Asia

Voice of Russia

WYFR [M-F]

1145

Deutsche Welle [M-F]\*

1155

Radio Japan [M-F]

1200 UTC

(8:00 AM EDT, 5:00 AM PDT)

BBC (af) [M-A]

BBC (am)

BBC (as pac) [M-A]

BBC (eu)

BBC (south as)

Canada (North-Quebec) [A-S]

China Radio Int'l

Monitor Radio Int'l [M-A]

Papua New Guinea

Polish Radio [A]

Polish Radio [M-F]\*

Radio Australia

Radio Canada Int'l [M-F]

Radio France Int'l

Radio New Zealand Int'l [H-T]

Radio Norway Int'l [S]

Radio Singapore Int'l

Radio Tashkent

Voice of America (as)

Voice of Russia

WHRI [A]

WYFR [M-F]

1203

Radio Korea

Voice of Free China

1204

HCJB [M-F]

1210

China Radio Int'l\*

1215

BBC (af) [M-A]\*

BBC (eu)\*

BBC (south as) [M-A]\*

1230

HCJB [M-F]\*

Radio Austria Int'l

Radio Bangladesh [S-M]

Radio Cairo

Radio Canada Int'l

Radio Finland

Radio Netherlands Int'l

Radio Singapore Int'l

Radio Sweden [M-F]

Radio Vlaanderen Int'l [S]

Radio Yugoslavia

Voice of Russia [M-A]

Voice of Turkey

Voice of Vietnam

WYFR [M-F]

1231

Radio France Int'l [T]\*

1240

Voice of Greece

1300 UTC

(9:00 AM EDT, 6:00 AM PDT)

BBC (af) (Newshour)

BBC (am) (Newshour)

BBC (as pac) (Newshour)

BBC (eu) (Newshour)

BBC (south as) (Newshour)

Canada (North-Quebec) [A-S]

China Radio Int'l

KNLS

Monitor Radio Int'l [M-A]

Papua New Guinea

Radio Australia

Radio Canada Int'l [S]

Radio Ghana

Radio Norway Int'l [S]

Radio Romania Int'l [M-A]

Radio Singapore Int'l

Radio Tanzania [A-S]

Radio Vlaanderen Int'l [M-A]

Swiss Radio Int'l

Voice of America (as)

Voice of Kenya

Voice of Russia

WWCR #1 [M-F]

WYFR [M-F]

1301

Radio Romania Int'l [S]

1303

Radio Pyongyang

1310

China Radio Int'l\*

R

1530

All India Radio\*  
 FEBA (Seychelles)  
 FEBC (Philippines)  
 Radio Austria Int'l  
 Radio Netherlands Int'l  
 Voice of Nigeria [M-H]  
 Voice of Russia [M-A]  
 WYFR [M-F]  
 1540  
 Radio Veritas [A-M]  
 1550  
 Voice of Med. (Malta) [F]  
 1555  
 Radio Japan [A]  
 Radio Veritas [A-M]  
 Voice of Med. (Malta) [M-H]

1600 UTC

(12:00 PM EDT, 9:00 AM PDT)

BBC (af)  
 BBC (am)  
 BBC (as pac)  
 BBC (eu)  
 BBC (south as)  
 Canada (North-Quebec) [A-S]  
 Channel Africa  
 China Radio Int'l  
 Deutsche Welle  
 Monitor Radio Int'l [M-A]  
 Radio Australia  
 Radio France Int'l  
 Radio Jordan  
 Radio Korea  
 Radio Norway Int'l [S]  
 Radio Pakistan  
 Radio Prague  
 Radio Tanzania  
 Radio Tirana  
 Voice of America (af) [A-S]  
 Voice of America (as)  
 Voice of America (me)  
 Voice of Ethiopia  
 Voice of Kenya  
 Voice of Russia  
 WINB [M-F]  
 WRNO [M-F]  
 WWCR #3 [M-F]  
 WYFR [A]

1604

HCJB [M-F]

1610

China Radio Int'l\*

1612

Vatican Radio

1615

Radio Sweden

Vatican Radio

1630

Channel Africa [F]\*

Deutsche Welle [T-F]\*

HCJB [M-F]\*

Radio Canada Int'l

Radio Dubai

Voice of America (af) [M-F]\*

Voice of America (as) (Special English)

Voice of America (me) (Special English)

Voice of Ethiopia  
 Voice of Russia [S-F]

1633

Deutsche Welle [M]\*

1645

BBC (am) [S-F]\*

Radio Canada Int'l [M-F]

1700 UTC

(1:00 PM EDT, 10:00 AM PDT)

BBC (af)

BBC (am)

BBC (as pac)

BBC (eu)

BBC (south as)

Canada (North-Quebec) [A]

Channel Africa

China Radio Int'l

HCJB

Monitor Radio Int'l [M-A]

Polish Radio [A]

Polish Radio [M-F]\*

Radio Australia

Radio France Int'l

Radio Japan

Radio New Zealand Int'l [M-F]\*

Radio Pakistan

Radio Prague

Swiss Radio Int'l

Voice of America (af)

Voice of America (as)

Voice of America (me)

Voice of Russia

WINB [M-F]

WWCR #3 [M-F]

1703

Radio Pyongyang

1710

China Radio Int'l\*

Radio Australia\*

1725

Radio New Zealand Int'l [F]\*

1730

Radio Austria Int'l

Radio Netherlands Int'l

Radio Romania Int'l

Radio Sweden [M-F]

Vatican Radio [F]

Voice of Russia

1740

BBC (af) [W-M]\*

1745

Radio Yerevan

1755

Radio Japan [A]

Radio New Zealand Int'l [M-H]\*

1758

BBC (af) [W]\*

1800 UTC

(2:00 PM EDT, 11:00 AM PDT)

All India Radio

BBC (af) (Newsdesk)

BBC (as pac) (Newsdesk)

BBC (eu) (Newsdesk)

BBC (south as) (Newsdesk)

Canada (North-Quebec) [A]

Monitor Radio Int'l [M-A]

Radio Australia

Radio Bulgaria

Radio Cameroon

Radio Mozambique

Radio New Zealand Int'l [M-F]\*

Radio Norway Int'l [S]

Radio Omdurman

Radio Tanzania

Radio Tirana

Radio Vlaanderen Int'l

Radio Yemen

Voice of America (af) [A-S]

Voice of America (af) [M-F]\*

Voice of America (me)

Voice of Kenya

Voice of Russia

WINB [M-F]

WWCR #1 [M-F]

WWCR #3 [M-F]

1815

Radio Bangladesh

1830

BBC (af) [A-S]\*

R Slovakia Int'l

Radio Kuwait

Radio Nacional de Venezuela

[M-A]

Radio Netherlands Int'l

Radio Yemen

Radio Yugoslavia

Voice of America (af) [A-S]

(Special English)

Voice of America (me) (Special English)

Voice of Russia

1835

Radio New Zealand Int'l [F]\*

1840

Voice of Greece [M-A]

1855

Radio New Zealand Int'l [M-H]\*

1858

BBC (af) [M-F]\*

1900 UTC

(3:00 PM EDT, 12:00 PM PDT)

All India Radio

BBC (af)

BBC (as pac) (Newshour)

BBC (eu) (Newshour)

China Radio Int'l

Deutsche Welle [T-S]

Monitor Radio Int'l [M-A]

Radio Australia

Radio Japan

Radio Korea

Radio New Zealand Int'l

Radio Romania Int'l [T-S]

Radio Tallinn [M-H]

Spanish National Radio

Swiss Radio Int'l (eu)

Voice of America (af)

Voice of America (as)

Voice of America (me)

Voice of Greece [M-A]

Voice of Russia

WHRI [M-F]

WINB [M-F]

WWCR #3 [S-H]

1901

Radio Romania Int'l [M]

1910

All India Radio [W]

China Radio Int'l\*

Radio Australia [M-F]\*

1930

Deutsche Welle [T-F]\*

Polish Radio [A-S]

Polish Radio [M-F]\*

Radio Austria Int'l

Radio Finland

Radio Korea

Radio Netherlands Int'l

1933

Deutsche Welle [M]\*

1935

RAI Italy

1955

Radio Japan [T-W/S]

2000 UTC

(4:00 PM EDT, 1:00 PM PDT)

BBC (af) (Newshour)

BBC (am)

BBC (as pac) [A]

BBC (eu)

BBC (eu) [S-F]\*

China Radio Int'l

Deutsche Welle

KVOH [A-S]

Monitor Radio Int'l [M-A]

Radio Australia

Radio Budapest

Radio Canada Int'l

Radio New Zealand Int'l

Radio Portugal Int'l [M-F]

Radio Prague

Swiss Radio Int'l

Voice of America (af) [A-S]

Voice of America (af) [M-F]\*

Voice of America (me)

Voice of Indonesia

Voice of Israel

Voice of Nigeria [M-F]

Voice of Russia

Voice of Turkey

WHRI [M-F]

WINB [M-F]

WWCR #3 [S-H]

2003

Radio Pyongyang

2007

Radio Damascus [M-F]

2010

China Radio Int'l\*

Radio New Zealand Int'l [S-H]\*

2025

RAI Italy

2030

Radio Netherlands Int'l

Radio Riga Int'l [M-F]

Radio Sweden [M-F]

Radio Thailand

Voice of Russia

2055

Radio Canada Int'l [M-F]

Voice of Indonesia [M]

2057

Radio Kuwait

2100 UTC

(5:00 PM EDT, 5:00 PM PDT)

All India Radio

BBC (af)

BBC (am)

BBC (as pac)

BBC (eu)

China Radio Int'l

Deutsche Welle

KVOH [S]

Monitor Radio Int'l [M-A]

Radio Australia

Radio Bulgaria

Radio Cameroon

Radio Canada Int'l

Radio Damascus [F]

Radio Havana Cuba [M-A]

Radio Japan

Radio New Zealand Int'l [A-H]

Radio Romania Int'l

Radio Ukraine Int'l

Radio Vlaanderen Int'l [M-F]

Radio Yugoslavia

Spanish National Radio

Voice of America (af)

Voice of America (as)

Voice of America (me)

Voice of Russia

WHRI [M-F]

WWCR #3 [M-F]

2110

China Radio Int'l\*

Radio Damascus [S-M]

Radio New Zealand Int'l [S-H]\*

2112

Radio Damascus [F]

2115

BBC (af)\*

BBC (eu)\*

Radio Damascus [T]

2120

Radio Cairo

2130

Radio Cairo

Radio Havana Cuba [M-A]\*

Radio Nacional de Venezuela

[M-A]

Radio Sweden [M-F]

Voice of Russia [M-F]

2145

Radio Damascus [W]

Radio Korea

2155

Radio Japan [A]

2200 UTC

(6:00 PM EDT, 3:00 PM PDT)

All India Radio

BBC (af) (Newsdesk)

BBC (am) (Newsdesk)

BBC (as pac) (Newsdesk)

BBC (eu) (Newsdesk)

Canada (North-Quebec) [A-S]

China Radio Int'l

Monitor Radio Int'l [M-A]

Radio Australia

Radio Budapest

Radio Canada Int'l

Radio Havana Cuba [M-A]

Radio Korea

Radio Yerevan

RAI Italy

Voice of America (as)

Voice of Russia

Voice of Turkey

WWCR #3 [S]

2203

Voice of Free China

2210

China Radio Int'l\*

2215

All India Radio [M/W/F]

Radio Cairo

2230

Radio Canada Int'l [A-S]

Radio Finland

Radio Yerevan

Voice of America (as) (Special English)

Voice of Russia

Voice of Turkey

2240

Radio Cairo

Voice of Greece [S-F]

2245

Organization of American States

[M-F]\*

2300 UTC

(7:00 PM EDT, 4:00 PM PDT)

AWR Latin America [H]\*

BBC (af)

BBC (am) [S-F]

BBC (as pac)

BBC (eu)

Deutsche Welle

Monitor Radio Int'l [M-A]

Radio Australia

Radio Bulgaria

Radio Canada Int'l [A-S]

Radio Japan

Radio New Zealand Int'l

Radio Vilnius

Voice of America (as)

Voice of Russia

WWCR #1 [M-F]

2303

Radio Pyongyang

2315

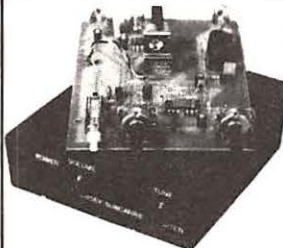
Radio Cairo

# RAMSEY America's #1 Source For Hobby Kits

## TONE GRABBER

Grab Touch-Tone numbers right off the air, phone or tape. A simple hook-up to any radio speaker or phone line is all that is required to instantly decipher touch-tone phone numbers or codes. A 256 digit memory stores decoded numbers and keeps its memory even in the event of power loss. An 8 digit LED display allows you to scroll through the memory bank to examine numbers. To make it easy to pick out number groups or codes, a "dash" is inserted between sets of digits that were decoded more than 2 seconds apart. A "central-office" quality crystal controlled decoder is used allowing rapid and reliable detection of numbers at up to 20 digits per second! For a professionally finished look, add our matching case set. Start cracking those secret codes tomorrow with the Tone Grabber!

TG-1 Tone Grabber kit	\$99.95
CTG Matching case set	\$14.95
TG-1WT Fully assembled TG-1 and case	\$149.95



## SCA DECODER

Tap into the world of commercial-free music and data that is carried over many standard FM broadcast radio stations. Decoder hooks to the demodulator of FM radio and tunes the 50-100 kHz SCA subcarrier band. Many radios have a demod output, but if your radio doesn't, it's easy to locate, or use our FR-1 FM receiver kit which is a

complete FM radio with a demod jack built-in. These "hidden" subcarriers carry lots of neat programming-from stock quotes to news to music, from rock to easy listening-all commercial free. Hear what you have been missing with the SCA-1.

SCA-1 Decoder kit	\$27.95
CSCA Matching case set	\$14.95
FR-1 FM receiver kit	\$24.95
CRR Matching case for FR-1	\$14.95

## BROADBAND PREAMP

Ever wish you could "perk up" your counter to read really weak signals? Or, how about boosting that cable TV signal to drive sets throughout the house, or maybe preamping the TV antenna to pull in that blacked out football game. And, if you're into small broadcasting, boost your transmitter power up to 100 mW! The PR-2 Broadband preamp is the answer to all those needs as well as many others. You can use the PR-2 anywhere a high gain, low noise, high power amp is called for: digging out those weak shortwave signals or putting new life into that scanner radio-especially at 800 MHz. The PR-2 has a high power compression point, meaning that it does not overload easily-in fact many folks use it for boosting the power on their FM-10A stereo transmitters. Newly designed microwave MMIC chips from NEC in Japan enable the PR-2 to have gain all the way up to 2 GHz, although we only spec it to 1 GHz-believe it or not, the connector lead length is the limiting factor! Customers tell us the PR-2 outperforms professional lab units by the "big boys" that go for hundreds more. The PR-2 is the ideal general purpose amp you'll wonder how you got along without.

PR-2 Specifications: Gain: 25dB, Noise Figure: 2.5 dB, Input/Output Impedance: 50-75 ohms, Compression point: +18 dBm

PR-2 Broadband Preamp, Fully Wired and Tested \$59.95

## AIRCRAFT RECEIVER

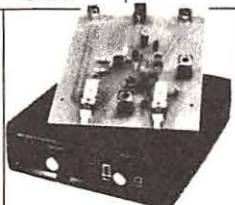
Tune into the exciting world of aviation. Listen to the airlines, big business corporate jets, hot-shot military pilots, local private pilots, control towers, approach and departure radar control and other interesting and fascinating air-band communications. You'll hear planes up to a hundred miles away as well as all local traffic. The AR-1 features smooth variable tuning of the entire air band from 118 to 136 MHz, effective AGC, superheterodyne circuitry, squelch, convenient 9 volt operations and plenty of speaker volume. Don't forget to add our matching case and knob set for a fine looking project you'll love to show. Our detailed instruction manual makes the AR-1 an ideal introduction to two life-long, fascinating hobbies at once-electronics and aviation! See *Kit Plans* magazine (January 1991) or *Popular Electronics* (January 1993) for excellent product reviews of the AR-1.

AR-1 Aircraft Receiver Kit	\$29.95
C-AR Case and Knobset for AR-1	\$14.95

## FOXHOUND DIRECTION FINDER

Locate hidden or unknown transmitters fast. The Foxhound direction finder connects to the antenna and speaker jack on any radio receiver, AM or FM from 1 MHz to 1 GHz. The antenna (a pair of dipole telescopic whips) is rotated until the Null meter shows a minimum. A pair of LEDs indicate to turn Left or Right. The Foxhound is ideal to use with a walkie-talkie, if you wish to transmit, go ahead, a built-in T/R switch senses any transmitted RF and switches itself out of circuit while you talk. It doesn't get any easier than this! We provide all parts except for a few feet of 1/2 inch PVC pipe available at any hardware store for a dollar or two. Add our matching case set for a complete finished unit. Be the one with the answers, win those transmitter hunts and track down those jammers, you'll do it all with your Foxhound.

DF-1 Foxhound direction finder kit	\$59.95
CDF Matching case set for DF-1	\$14.95
FHT-1 SlyFox Foxhound transmitter kit	\$129.95
FHID-1 Voice ID option	\$29.95
CFHT Heavy duty metal case set for FHT-1	\$29.95



## SHORTWAVE CONVERTER

The SC-1 converter brings the sounds of the world right into your car radio or home stereo (set to AM broadcast band). Front panel push switches let you choose easily between regular AM radio and the shortwave bands. An additional switch allows the selection of any two bands of interest, each 1 MHz wide. Set one range for daytime frequencies and one for nighttime when propagation is different, choose any two frequencies between 3 and 22 MHz. Frequencies are tuned on your AM radio, making it easy to log stations or set presets. A built-in antenna switch automatically switches the existing AM antenna to either the radio or converter, making hook-up as easy and fast. As with many of our kits, a handsome matching case and knob set is available to put the finishing touches on your kit.

SC-1 Shortwave Converter Kit	\$27.95
CSC Matching Case and Knob Set	\$14.95

## FM RECEIVER/TRANSMITTER

Keep an ear on the local repeater, police, weather or just tune around. These sensitive superhet receivers are fun to build and use. Tunes any 5 MHz portion of the band and have smooth varactor tuning with AFC, dual conversion, ceramic filtering, squelch and plenty of speaker volume. Complete manual details how the rigs work and applications. 2M FM transmitter has SW RF out, crystal control (146.52 included), pro-specs and data/mike inputs. Add our case sets for a nice finish.

FM Receiver kit	\$34.95
Specify band: FR-146 (2M), FR-6 (6M), FR-10 (10M), FR-220 (220MHz)	\$14.95
CFR Matching case set	\$14.95
FT-146 Two Meter FM trans kit	\$99.95

## SCANNER CONVERTER

Tune in on the 800-950 MHz action using your existing scanner. Frequencies are converted with crystal referenced stability to the 400-550 MHz range. Instructions are even included on building high performance 900 MHz antennas. Well designed circuit features extensive filtering and convenient on-off/bypass switch. Easy one hour assembly or available fully assembled. Add our matching case set for a professional look.

SCN-1 Scanner converter kit	\$49.95
CSCN Matching case set	\$14.95
SCN-1WT Assembled SCN-1 and case	\$89.95

## STEREO TRANSMITTER

Run your own Stereo FM radio station! Transmits a stable signal in the 88-108 MHz FM broadcast band up to 1 mile. Detailed manual provides helpful info on FCC regs, antenna ideas and range to expect. Latest design features adjustable line level inputs, pre-emphasis and crystal controlled subcarrier. Connects to any CD or tape player, mike mixer or radio. Includes free tuning tool too! For a pro look add our matching case set with on-board whip antenna.

FM-10A Stereo transmitter kit	\$34.95
CFM Case, whip ant set	\$14.95

## INTERCEPTOR

The Interceptor will lock on instantly to the nearest transmitter and allow you to listen with perfect audio quality. Since the Interceptor does not have to search through all frequencies, those quick transmissions that are hopelessly lost on scanners are captured easily. The Interceptor does not need tuning, making it ideal for hands-free surreptitious monitoring of nearby transmissions. The Interceptor is complete self-contained with internal speaker and earphone jack for private listening. Included are: Nicad battery pack, AC/adaptor charger, antenna and earphone. Increase your security and awareness-intercept the communications around you with the Interceptor. Fully wired with 1 year warranty. Covers 30-2000 MHz frequency range, FM deviations from 5 kHz to 200 kHz.

R10 Interceptor, Fully Wired 1 year warranty	\$349.95
--	----------

## AM BROADCAST TRANSMITTER

High quality, true AM broadcast band transmitter is designed exactly like the big commercial rigs. Power of 100 mW, legal range of up to 1/4 mile. Accepts line level inputs from tape and CD players and mike mixers, tunable 550-1750 kHz. Complete manual explains circuitry, help with FCC regs and even antenna ideas. Be your own Rush Limbaugh or Rick Dees with the AM-1! Add our case set for a true station look.

AM-1 Transmitter kit	\$29.95
CAM Matching case set	\$14.95

## SHORTWAVE RECEIVER

Here's a complete shortwave radio guaranteed to inspire awe in any listener. Imagine tuning in the BBC, Radio Moscow, Radio Baghdad and other services with just a couple of feet of antenna. This very sensitive (about a microvolt!) receiver is a true superhet design with AGC, RF gain control and plenty of speaker volume. Smooth varactor diode tuning allows you to tune any 2 MHz portion of the 4 to 11 MHz frequency range, and the kit conveniently runs on a 9 volt battery. Add our matching custom case and knob set to give your radio a finished, polished, look. Amaze yourself and others-see how you can listen to the world on a receiver you built in an evening.

SR-1 Shortwave Radio Kit	\$34.95
CSR Case and Knob Set	\$14.95

## ORDERS ONLY CALL 1-800-446-2295

(No tech info at this number)

TECH/ORDER/INFO 716-924-4560 FAX 716-924-4555

TERMS: Satisfaction guaranteed. Examine for 10 days. If not pleased return it in original form for refund. Add \$4.95 for shipping, handling and insurance. For foreign orders add 20% for surface mail. COD (U.S. only) add \$5.00. Orders under \$20 add \$3.00 NY residents add 7% sales tax. 90-day parts warranty on kit parts. 1-year parts and labor warranty on wired units.



RAMSEY ELECTRONICS, INC.  
793 CANNING PARKWAY, VICTOR NY 14564

## SCRAMBLER/DESCRAMBLER

Descramble most scramble systems heard on your scanner radio or set up your own scramble communication system over the phone or radio. Latest 3rd generation IC is used for fantastic audio quality-equivalent to over 30 op-amps and mixers! Crystal controlled for crystal clear sound with a built-in 2 watt audio amp for direct radio hook-up. For scramble systems, each user has a unit for full duplex operation. Communicate in privacy with the SS-70. Add our case set for a fine professional finish.

SS-70 Scrambler/Descrambler kit	\$39.95
CSSD Matching case set	\$14.95
SS-70WT Fully assembled SS-70 and case set	\$79.95



## DSP FILTER

What is DSP? DSP allows the "construction" of various filters of great complexity by using computer code. This allows us to have easy access to a variety of filters, each perfectly optimized for whatever mode we are operating. The DSP II has been designed to operate in 10 different modes. Four filters are optimized for reducing interference to SSB phone signals from CW, heterodynes and random noise interference. Four more filters operate as "brick-wall" CW bandpass filters. The remaining two filters are designed for reliable recovery of RTTY and HF packet radio information signals. A single front panel switch selects any of these filters. Easy hookup to rigs speaker jack.

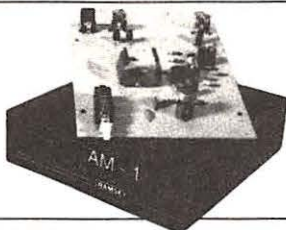
W9GR DSP Filter	\$299.95
12V DC Power Supply	\$11.95

FULLY WIRED & TESTED

## ACTIVE ANTENNA

Cramped for space? Get longwire performance with this desktop antenna. Properly designed unit has dual HF and VHF circuitry and built-in whip antenna, as well as external jack. RF gain control and 9V operation makes unit ideal for SWLs, traveling hams or scanner buffs who need hotter reception. The matching case and knob set gives the unit a hundred dollar look!

AA-7 Kit	\$28.95
CAA Matching case & knobset	\$14.95



0000-0030	Australia, Radio	9610as	13605pa	13745as	17750as	0000-0100	United Kingdom,BBC London	5965as	5970sa	5975na	6175na
0000-0100 vl	Australia, VL8A Alice Spg	4835do						7325na	9590na	9760as	9915sa
0000-0100 vl	Australia, VL8K Katherine	5025do						11750na	11955as		
0000-0100 vl	Australia, VL8T Tent Crk	4910do				0000-0015	United Kingdom,BBC London	6195as	7110as	7180as	9580as
0000-0100	Bulgaria, Radio	7205na	9700na					11945as			
0000-0015	Cambodia, Natl Voice of	11940as				0000-0100	USA, KAIJ Dallas TX	13740am	13815am		
0000-0100	Canada, CBC N Quebec Svc	9625do				0000-0100	USA, KTVN Salt Lk City UT	7510am			
0000-0100	Canada, CFCX Montreal	6005do				0000-0100	USA, KVOH Los Angeles CA	9785am			
0000-0100	Canada, CFRX Toronto	6070do				0000-0100	USA, KWHR Naalehu HI	17510as			
0000-0100	Canada, CFVP Calgary	6030do				0000-0100	USA, Monitor Radio Intl	7535na	9430am		
0000-0100	Canada, CHNX Halifax	6130do				0000-0100	USA, VOA Washington DC	5995as	6130am	7215as	7405am
0000-0100	Canada, CKZN St John's	6160do						9455am	9770as	9775am	9890as
0000-0100	Canada, CKZU Vancouver	6160do						11580am	11695am	11760as	13740am
0000-0100	Canada, RCI Montreal	5960na	9755na	11920na				15120am	15185au	15205am	15290as
0000-0100	China, China Radio Intl	9710na	11575af	11715na				17735as	17820as		
0000-0100 mtwtf	Costa Rica, AWR Alajuela	5030ca	9725am	11870ca		0000-0100	USA, WEWN Birmingham AL	5825eu	7425na	9410eu	
0000-0100	Costa Rica, R Peace Intl	7385am	9400am			0000-0100	USA, WHRI Noblesville IN	5745am	9495am	17510am	
0000-0030	Czech Rep, Radio Prague	5930na	7345na			0000-0100	USA, WINB Red Lion PA	11950na			
0000-0030	Egypt, Radio Cairo	9900na				0000-0100	USA, WJCR Upton KY	7490na	13595na		
0000-0100	Ghana, Ghana Broadc Corp	3366do	4915do			0000-0100 m	USA, WRMI/R Miami Intl	9955am			
0000-0030 vl	Guatemala, AWR	5980ca				0000-0100 twhfa	USA, WRMI/R Miami Intl	9955am			
0000-0045	India, All India Radio	9705as	9950as	11745as	13750as	0000-0100	USA, WRNO New Orleans LA	7355am			
		15145as				0000-0100	USA, WVHA Green Bush ME	7465eu			
0000-0015 f/vl	Italy, IRRS Milan	7125va				0000-0100	USA, WWCR Nashville TN	5065am	7435am	13845am	
0000-0100	Lebanon, Wings of Hope	6280me	9960me			0000-0044	USA, WYFR Okeechobee FL	6085na			
0000-0004	Lithuania, Radio Vilnius	7150na				0000-0030 mtwhfa	Yugoslavia, Radio	6195na	7115na		
0000-0100	Malaysia, Radio	7295do				0015-0030 sm	USA, VOA Washington DC	11835am	15155am		
0000-0100	Malaysia, RTM/Kota Kinab	5980do				0030-0100	Australia, Radio	13605pa	13745as	13755as	15365pa
0000-0100	Malaysia, RTM/Kuching	7160do						15415as	17795pa	17860pa	
0000-0030	Netherlands, Radio	6020na	6165na			0030-0100	Ecuador, HCJB Quito	9745am	15540am	21455am	
0000-0100	New Zealand, R NZ Intl	15115pa				0030-0100	Iran, VOIRI Tehran	7100na	9022na	9670na	
0000-0050	North Korea, R Pyongyang	11335na	13760na	15130na	17835na	0030-0100	Netherlands, Radio	5905as	6020na	6165na	7305as
0000-0100 mtwhfa	Palau, KHBN/Voice of Hope	11980as						9840na	11655na		
0000-0100 vl	Papua New Guinea, NBC	4890do	9675do			0030-0100	Russia, Voice of	7105na	7165na	13640as	
0000-0100	Philippines, FEBC/R Intl	15450as				0030-0100	Sri Lanka, SLBC Colombo	15425as			
0000-0100	Russia, Voice of	7125af	9750na	11750na	17570as	0030-0100	Sweden, Radio	6065sa	9810sa		
0000-0100	Spain, R Exterior Espana	9540na				0030-0100	Thailand, Radio	9655as	11845af	11905as	
0000-0030											

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## FREQUENCIES

0100-0200	Australia, AF Radio	13525as				0100-0130	Philippines, FEBC/R Intl	15450as			
0100-0200	Australia, Radio	9580pa	9610as	9660pa	11715as	0100-0200	Russia, Voice of	7105na	7125na	9920me	13640as
		11855as	13605as	13605pa	13755as			17665as	17890as		
		15240pa	15365pa	15415as	15510as			7275as			
		17715as	17750as	17795pa	17860pa	0100-0200 vl	Slovakia, AWR	5930na	9440na		
		17880as				0100-0130	Slovakia, R Slovakia Intl	6575na	7550eu	15575na	
0100-0200 vl	Australia, VL8A Alice Spg	4835do				0100-0200	South Korea, R Korea Intl	9540na			
0100-0200 vl	Australia, VL8K Katherine	5025do				0100-0200	Spain, R Exterior Espana	15425as			
0100-0200 vl	Australia, VL8T Tent Crk	4910do				0100-0200	Sri Lanka, SLBC Colombo	5885na	6135na	9885na	9905na
0100-0200 vl	Canada, CBC N Quebec Svc	9625do				0100-0130	Switzerland, Swiss R Intl	5965as	5970sa	5975na	6175na
0100-0200	Canada, CFCX Montreal	6005do				0100-0200	United Kingdom, BBC London	7325na	9590na	9760as	9915sa
0100-0200	Canada, CFRX Toronto	6070do						11750na	11955as	15360as	17790as
0100-0200	Canada, CFVP Calgary	6030do						5810am	13740am		
0100-0200	Canada, CHNX Halifax	6130do				0100-0200	USA, KAIJ Dallas TX	7510am			
0100-0200	Canada, CKZN St John's	6160do				0100-0200	USA, KTVN Salt Lk City UT	9785am			
0100-0200	Canada, CKZU Vancouver	6160do				0100-0200	USA, KVOH Los Angeles CA	17510as			
0100-0130	Costa Rica, AWR Alajuela	5030ca	6150sa	7325am	9725am	0100-0200	USA, KWHR Naalehu HI	7535na	9430am		
0100-0200	Costa Rica, R Peace Intl	7385am	9400am	15050am		0100-0200	USA, Monitor Radio Intl	5995am	6130am	7405am	9455am
0100-0200	Cuba, Radio Havana Cuba	6000na	9830na			0100-0200	USA, VOA Washington DC	9775am	11580am	13740am	15120am
0100-0130	Czech Rep, Radio Prague	7345na						15205am	15340as	17740as	
0100-0200	Ecuador, HCJB Quito	9745am	15540am	17490eu	21455eu	0100-0200	USA, WEWN Birmingham AL	5825eu	9495am	17510am	
0100-0150	Germany, Deutsche Welle	6040na	6085na	6145na	9650na	0100-0200	USA, WHRI Noblesville IN	5745am			
		9670na	9700na			0100-0200	USA, WINB Red Lion PA	11950na			
0100-0200 m	Guatemala, Radio Cultural	3300do				0100-0200	USA, WJCR Upton KY	7490na	13595na		
0100-0130	Hungary, Radio Budapest	6025na	9835na	11910na		0100-0130 twhfa	USA, WRMI/R Miami Intl	9955am			
0100-0130	Iran, VOIRI Tehran	7100na	9022na	9670na		0100-0200	USA, WRNO New Orleans LA	7355am			
0100-0110	Italy, RAI Rome	9645na	11800na			0100-0200	USA, WVHA Green Bush ME	7465eu			
0100-0200	Japan, NHK/Radio	9565na	11840as	11860as	11910as	0100-0200	USA, WWCR Nashville TN	5065am	5935am	7435am	
		15195as	17810as	17845as		0100-0200	USA, WYFR Okeechobee FL	6065na	9505na		
0100-0200 smtwh	Malaysia, Radio	7295do				0100-0130	Yugoslavia, Radio	6195eu			
0100-0130	Moldova, R Moldova Intl	7190na				0130-0200	Austria, R Austria Intl	9655na			
0100-0200	Netherlands, Radio	5905as	7305as			0130-0150	Greece, Voice of	6260na	7448na	9935na	
0100-0125	Netherlands, Radio	6020na	6165na	9840na	11655na	0130-0200	Netherlands, Radio	9860as	11655as		
0100-0200	New Zealand, R NZ Intl	15115pa				0130-0200 twhf	Portugal, Radio	9570na	9705na		
0100-0130 m	Norway, Radio Norway Intl	5905na	5910na	7450na		0130-0200	Sweden, Radio	9895au	11695as		
0100-0200 vl	Papua New Guinea, NBC	4890do	9675do			0140-0200	Vatican State, Vatican R	5980as	7335as		

## SELECTED PROGRAMS

## Sundays

- 0110 BBC (as pac): Press Review. A look at what the papers say.  
0115 BBC (as pac): Variable Feature. Special features and new series.  
0130 BBC (am): People and Politics. Background to the British political scene.  
0130 BBC (as pac): From Our Own Correspondent. BBC correspondents comment on the background to the news.  
0130 BBC (south as): Breakfast Briefing. News, views, sport, business and press reviews to start the day in South Asia.  
0145 BBC (as pac): Write On. Air your views about World Service: write to PO Box 76, Bush House, Strand, London WC2B 4PH. 0145 BBC (south as): Letter from America. See S 0030.

## Mondays

- 0110 BBC (as pac): Press Review. See S 0110.  
0115 BBC (as pac): Variable Feature. See S 0115.  
0130 BBC (am): Composer of the Month. In depth looks at classical composers and their music. A different composer is featured each month.  
0130 BBC (as pac): Anything Goes. See S 0530.  
0130 BBC (south as): Breakfast Briefing. See S 0130.  
0145 BBC (south as): Global Concerns. Update on environmental issues.

## Tuesdays

- 0110 BBC (as pac): Press Review. See S 0110.  
0115 BBC (as pac): Variable Music Feature. See S 0015.  
0130 BBC (am): Omnibus. See M 1130.  
0130 BBC (as pac): Health Matters. See M 0445.  
0130 BBC (south as): Breakfast Briefing. See S 0130.  
0145 BBC (south as): The World Today. See M 1645.

## Wednesdays

- 0110 BBC (as pac): Press Review. See S 0110.  
0115 BBC (as pac): On Screen. See S 1215.  
0130 BBC (am): Andy Kershaw's World of Music. See S 1230.  
0130 BBC (as pac): Variable Music Feature. See S 0015.  
0130 BBC (south as): Breakfast Briefing. See S 0130.  
0145 BBC (south as): The World Today. See M 1645.

## Thursdays

- 0110 BBC (as pac): Press Review. See S 0110.

- 0115 BBC (as pac): New Ideas. See S 1530.  
0130 BBC (am): Assignment. A weekly examination of a topical issue.  
0130 BBC (south as): Breakfast Briefing. See S 0130.  
0135 BBC (as pac): Variable Feature. See S 0115.  
0145 BBC (as pac): The Farming World. See M 0015.  
0145 BBC (south as): The World Today. See M 1645.

## Fridays

- 0110 BBC (as pac): Press Review. See S 0110.  
0115 BBC (as pac): Variable Feature. See S 0115.  
0130 BBC (am): Focus on Faith. Comment and discussion on the major issues in the worlds of faith.

- 0130 BBC (south as): Breakfast Briefing. See S 0130.  
0145 BBC (as pac): Global Concerns. See M 0145.  
0145 BBC (south as): The World Today. See M 1645.

## Saturdays

- 0110 BBC (as pac): Press Review. See S 0110.  
0115 BBC (as pac): Seven Days. See A 0030.  
0130 BBC (am): Network UK. See H 1430.  
0130 BBC (as pac): Jazz Now and Then. George Reid presents a mixture of jazz for all ages.  
0130 BBC (south as): Breakfast Briefing. See S 0130.  
0145 BBC (as pac): Good Books. See M 0030.  
0145 BBC (south as): The World Today. See M 1645.

## HAUSERS HIGHLIGHTS:

## BELGIUM

RVI Z-95 English includes: 1300 (Sun 1230) on 13670; 2330 on 9925 to us, new 13800 to S. America; *Radio World* moved from Sat & Mon to Sun (RVI via Joe Hanlon, Steven Cline, Tom Kuca, Bob Thomas, Diane Mauer, Paul Brems via Thurman)

## SOUTH KOREA: RADIO KOREA INT'L

Summer schedule to Americas:

via Canada	1030 UTC	11715 kHz
direct	0100	11810, 15575
	0600	7205
General Service		
	1200	7180
	1230	9570, 9640, 13670

(RKI SW Feedback)

## FREQUENCIES

0200-0300 twfha	Argentina, RAE	11710am				0200-0300 vl	Slovakia, AWR	7270as			
0200-0300	Australia, AF Radio	13525as				0200-0230	Sri Lanka, SLBC Colombo	15425as			
0200-0300	Australia, Radio	9580pa	9660pa	13605as	15240pa	0200-0300	Taiwan, VO Free China	5950na	9680na	11745ca	11825as
		15365pa	15415as	15510as	17750as			15345as			
		17795pa	17860pa	17880as		0200-0300	United Kingdom, BBC London	5965as	5970sa	5975na	6135af
0200-0300 vl	Australia, VL8A Alice Spg	4835do						6175na	7235me	7325na	9590na
0200-0300 vl	Australia, VL8K Katherine	5025do						9760as	9915sa	11955as	15360as
0200-0300 vl	Australia, VL8T Tent Crk	4910do						17790as			
0200-0300 vl	Canada, CBC N Quebec Svc	9625do				0200-0300	USA, KAIJ Dallas TX	5810am	9815na		
0200-0300	Canada, CFCX Montreal	6005do				0200-0300	USA, KTBN Salt Lk City UT	7510am			
0200-0300	Canada, CFRX Toronto	6070do				0200-0300	USA, KVOH Los Angeles CA	9785am			
0200-0300	Canada, CFVP Calgary	6030do				0200-0300	USA, KWHR Naalehu HI	17510as			
0200-0300	Canada, CHNX Halifax	6130do				0200-0300	USA, Monitor Radio Intl	5850na	9430na		
0200-0300	Canada, CKZN St John's	6160do				0200-0300	USA, VOA Washington DC	6130sa	7115as	7205as	7215as
0200-0300	Canada, CKZU Vancouver	6160do						9455sa	9740as	11705as	15250as
0200-0300	Canada, RCI Montreal	6120na	9535am	9755na	11725na			15370as	17740as	21550as	
		11845na	13720na			0200-0230 twfha	USA, VOA Washington DC	5995am	7405am	9775am	11580am
0200-0300	Costa Rica, R Peace Intl	7385am	9400am	12150am				13740am	15120am	15205am	
0200-0300	Cuba, Radio Havana Cuba	6000na	9820na	9830na		0200-0300	USA, WEWN Birmingham AL	7425na	9465me		
0200-0300	Ecuador, HCJB Quito	9745am	15540am	21455am		0200-0300	USA, WHRI Noblesville IN	5745am	9495am	17510am	
0200-0300	Egypt, Radio Cairo	9475na				0200-0300	USA, WINB Red Lion PA	11950na			
0200-0250	Germany, Deutsche Welle	6035as	6130as	7255as	7265as	0200-0300	USA, WJCR Upton KY	7490na	13595na		
		7285as	9515as	9615as	9690as	0200-0300	USA, WRNO New Orleans LA	7355am			
0200-0300	Kenya, Kenya Broadc Corp	4885do	4935do			0200-0300	USA, WVHA Green Bush ME	7465am			
0200-0300 smtwh	Malaysia, Radio	7295do				0200-0300	USA, WWCN Nashville TN	5065am	5935am	7435am	
0200-0230	Myanmar, Radio	5990do				0200-0300	USA, WYFR Okeechobee FL	6065na	9505na		
0200-0230	Netherlands, Radio	5905as	7305as	9860as	11655as	0230-0300	Albania, R Tirana Intl	9580na	11840na		
0200-0300	New Zealand, R NZ Intl	15115pa				0230-0300	Austria, R Austria Intl	9655na	9870sa	13730sa	
0200-0300 vl	Papua New Guinea, NBC	4890do	9675do			0230-0300	Hungary, Radio Budapest	5955na	9835na	11910na	
0200-0300	Romania, R Romania Intl	5990na	6155na	9510na	9570na	0230-0245	Pakistan, Radio	7290as	15190as	17705as	17725as
		11940na						21730as			
0200-0300	Russia, Voice of	5940na	7105na	7205eu	7225na	0230-0300	Russia, Voice of	5905na	9850as		
		7270na	9825na	12050na	13640as	0230-0300	Sweden, Radio	7120na	9850na		
		15425na	15455na	17665as		0250-0300	Vatican State, Vatican R	6095na	7305na		

## SELECTED PROGRAMS

## Sundays

- 0230 BBC (as pac): Variable Feature. See S 0115.  
 0230 BBC (eu): Variable Feature. See S 0115.  
 0230 BBC (south as): In Praise of God. Weekly programme of worship and meditation.

## Mondays

- 0230 BBC (am): Meridian. See S 0630.  
 0230 BBC (as pac): Composer of the Month. See M 0130.  
 0230 BBC (eu): Composer of the Month. See M 0130.  
 0230 BBC (south as): Composer of the Month. See M 0130.

## Tuesdays

- 0230 BBC (am): Discovery. In-depth look at scientific research.  
 0230 BBC (as pac): Variable Comedy/Quiz Feature. See S 1530.  
 0230 BBC (eu): Variable Feature. See S 0115.  
 0230 BBC (south as): Variable Comedy/Quiz Feature. See S 1530.

## Wednesdays

- 0230 BBC (am): Variable Feature. See S 0115.  
 0230 BBC (as pac): Andy Kershaw's World of Music. See S 1230.  
 0230 BBC (eu): Andy Kershaw's World of Music. See S 1230.  
 0230 BBC (south as): Andy Kershaw's World of Music. See S 1230.

## Thursdays

- 0230 BBC (am): Meridian. See S 0630.  
 0230 BBC (as pac): Sports International. Live commentaries and interviews, features and discussions.  
 0230 BBC (eu): Sports International. See H 0230.  
 0230 BBC (south as): Sports International. See H 0230.

## Fridays

- 0230 BBC (am): Variable Drama. See S 1130.  
 0230 BBC (as pac): Variable Drama. See S 1130.  
 0230 BBC (eu): Thirty-Minute Drama. See T 1130.  
 0230 BBC (south as): Variable Feature. See S 0115.

## Saturdays

- 0230 BBC (am): Meridian. See S 0630.  
 0230 BBC (as pac): People and Politics. See S 0130.  
 0230 BBC (eu): People and Politics. See S 0130.  
 0230 BBC (south as): People and Politics. See S 0130.

## NETHERLANDS: RNI

Summer schedule changes, at 2330-0130 resumes using compatible USB on 9840 in order to protect Budapest on 9835; at 1130 to Europe, Nauen, Germany relay on 9650, and //6045 could be Jülich or Flevo. W. N. Am. at 0330 shifts to 0430 (RNMN) That's to accommodate two consecutive hours of Spanish at 0230, which now like English has different features in the two hours, on 6020-Flevo, 6165 & 9590-Bonaire; also now three hours at 2230-0125, the third hour repeating the first, on 15315-B and 9895-F; 2230-0025 also 11715-F, 2230-2325 also 11680-B. *Radio-Enlace*, Fri & UT Sat DX program, expands to 28 mins. Fri 2250, Sat 0050, 0250, now repeated Sun 2350, Mon 0350 (Jaime Báguena García, RN) English audible in N. Am. includes: 0730 on 11895, 9720, 0830 & 0930 on 9720. 1330 & 1430 on 15150, 13700, 9890; 1830 & 1930 on 17605, 15315; to us at 2330 & 0030 on 6020, 6165, 9840-USB, 0430 on 9590, 6165 (RNMN)

## THANK YOU ...

## ADDITIONAL CONTRIBUTORS TO THIS MONTH'S SHORTWAVE GUIDE:

Gerald R. Brookman, Kenai, AK; Jeff Demers, Manchester, NH; Bob Fraser, Cohasset, MA; Mike Hardester, Jacksonville, NC; Jim Moats, Ravenna, OH; Loyd Van Horn, Brasstown, NC; *BBC World-wide*; *BBC Summary of World Broadcasts*; Grove Enterprises BBS; Internet Shortwave Newsgroup via Larry Van Horn.

## RadioMap™

Transmitter sites in your area are researched and marked on a beautiful 8-1/2 x 11 full color plot. See FCC licensed sites from VLF through microwave including police, fire, cellular phone sites, business, industrial, broadcasters and selected FAA transmitter sites. Call signs, frequency assignments, and names provided. Ham radio stations not included.

You choose the map center location—your neighborhood, near your office, around sports stadiums—anywhere within the United States. We adjust map coverage for best readability, depending on transmitter site density.

Invaluable to radio professionals and hobbyists for identifying towers, sources of radio interference etc. Send nearest street intersection and check for \$25.95 payable to Robert Parnass.

Robert Parnass, M.S.  
Radio Electronics Consulting  
2350 Douglas Road, Oxnard, IL 60654

## FREQUENCIES

0300-0400	Australia, Radio	9580pa 15365pa 17860pa	9660pa 15415as	13605pa 15510as	15240pa 17795pa	0300-0400 vi 0300-0400	Slovakia, AWR Taiwan, VO Free China	6050af 5950na 15345as	7270as 9680na	11745as	11825as
0300-0400 vi	Australia, VL8A Alice Spg	4835do				0300-0400	Thailand, Radio	11890na			
0300-0400 vi	Australia, VL8K Katherine	5025do				0300-0400	Turkey, Voice of	9445na			
0300-0400 vi	Australia, VL8T Tent Crk	4910do				0300-0400	Ukraine, R Ukraine Intl	4870na 11790na	6055na 11870na	7180na	9810na
0300-0400	Bahrain, Radio	6010do				0300-0330	United Kingdom, BBC London	5970sa 9760as	6135af 9915sa	7235me 15360as	7325na 15380as
0300-0400	Botswana, Radio	4830af	7255af			0300-0400	United Kingdom, BBC London	3255af 6190af 15310as	5975na 9410me	6005af 9600af	6175na 11760as
0300-0400 vi	Canada, CBC N Quebec Svc	9625do				0300-0400	USA, KAIJ Dallas TX	5810am	9815am		
0300-0400	Canada, CFCX Montreal	6005do				0300-0400	USA, KTVN Salt Lk City UT	7510am			
0300-0400	Canada, CFRX Toronto	6070do				0300-0400	USA, KVOH Los Angeles CA	9785am			
0300-0400	Canada, CFVP Calgary	6030do				0300-0400	USA, KWHR Naalehu HI	17510as			
0300-0400	Canada, CHNX Halifax	6130do				0300-0400	USA, Monitor Radio Intl	5850na	9455af		
0300-0400	Canada, CKZN St John's	6160do				0300-0400	USA, VOA Washington DC	6035af 7405af	7105af 9575af	7280af 9885af	7340af
0300-0400	Canada, CKZU Vancouver	6160do				0300-0400	USA, WEWN Birmingham AL	7425na			
0300-0400 sm	Canada, RCI Montreal	6000ca 9755ca	6120ca 11725ca	9535ca 11845ca	9725ca	0300-0400	USA, WHRI Noblesville IN	5745am	9495am	17510am	
0300-0400	China, China Radio Intl	9690na	9710na	11715na		0300-0400	USA, WINB Red Lion PA	11950eu			
0300-0400	Costa Rica, R Peace Intl	7385am	9400am			0300-0400	USA, WJCR Upton KY	7490na	13595na		
0300-0400 vi	Costa Rica, Faro del Carib	5055do				0300-0400	USA, WRNO New Orleans LA	7355am			
0300-0400	Cuba, Radio Havana Cuba	6000na	9820na	9830na		0300-0400	USA, WWCR Nashville TN	5065am	5935am	7435am	
0300-0330	Czech Rep, Radio Prague	5930na	7345na			0300-0400	USA, WYFR Okaloosa FL	6065na	9505na		
0300-0400	Ecuador, HCJB Quito	9745am	15540am	21455am		0300-0315	Vatican State, Vatican R	6095na	7305na		
0300-0330	Egypt, Radio Cairo	9475na				0300-0400	Zimbabwe, ZBC/Radio 3	3306do	3396do	4828do	
0300-0350	Germany, Deutsche Welle	6045na 9650na	6085na	6120na	9535na	0315-0330 sh	Greece, Voice of	6260na	7448na	9935na	
0300-0400	Guatemala, Radio Cultural	3300do				0320-0350	Vatican State, Vatican R	5865af	7360af	9725af	
0300-0400	Japan, NHK/Radio	5960na 11920na 17845as	9565na 15210as	11885na 15230na	11895na 17810as	0330-0400	Czech Rep, Radio Prague	5930as	7345af	9440me	
0300-0400	Kenya, Kenya Broad Corp	4885do	4935do			0330-0400 fas	Mongolia, R Ulan Bator	7290na	12000na		
0300-0400 s	Lebanon, Wings of Hope	9960me				0330-0400	Netherlands, Radio	6015na	6165na		
0300-0400 smtwh	Malaysia, Radio	7295do				0330-0400	Swaziland, Trans World R	9500af			
0300-0330 tw	Mongolia, R Ulan Bator	7290na	12015na			0330-0400	Sweden, Radio	6200na	7120na		
0300-0325	Netherlands, Radio	9860as	11655as			0330-0400	Tanzania, Radio	5050af			
0300-0400	New Zealand, R NZ Intl	15115pa				0330-0400	UAE, Radio Dubai	11945na	13675na		
0300-0400 vi	Papua New Guinea, NBC	4890do	9675do			0330-0400	United Kingdom, BBC London	9610af 17790as	11730af	15280as	15575af
0300-0400	Russia, Voice of	5905na 7180na 15425na	5940na 7225na	6035eu 7270na	7105na 9825na	0340-0350	Greece, Voice of	6260na	7448na	9935na	
0300-0400	S Africa, Channel Africa	5995af	9585af	15240af		0345-0400	Tajikistan, Radio	7245as			

## SELECTED PROGRAMS

## Sundays

- 0305 BBC (am): World Business Review. See S 0305.  
 0305 BBC (as pac): World Business Review. A look back at the previous week's business and a preview of upcoming events.  
 0315 BBC (af): Sports Roundup. The latest sports news.  
 0315 BBC (am): Sports Roundup. See S 0315.  
 0315 BBC (as pac): Sports Roundup. See S 0315.  
 0315 BBC (eu): Sports Roundup. See S 0315.  
 0315 BBC (south as): Sports Roundup. See S 0315.  
 0330 BBC (am): From Our Own Correspondent. See S 0130.  
 0330 BBC (as pac): The John Dunn Show. A melodic mix of songs old and new.  
 0330 BBC (eu): From Our Own Correspondent. See S 0130.  
 0330 BBC (south as): From Our Own Correspondent. See S 0130.  
 0335 BBC (af): Postmark Africa. Expert answers to any question under the sun.  
 0345 BBC (am): Variable Feature. See S 0115.  
 0350 BBC (eu): Waveguide. Hear World Service better.  
 0350 BBC (south as): Write On. See S 0145.

## Mondays

- 0305 BBC (am): World Business Brief. See S 1205.  
 0305 BBC (as pac): World Business Brief. See S 1205.  
 0315 BBC (af): Sports Roundup. See S 0315.  
 0315 BBC (am): Sports Roundup. See S 0315.  
 0315 BBC (as pac): Sports Roundup. See S 0315.  
 0315 BBC (eu): Sports Roundup. See S 0315.  
 0315 BBC (south as): Sports Roundup. See S 0315.  
 0330 BBC (am): Variable Comedy/Quiz Feature. See S 1530.  
 0330 BBC (as pac): Off the Shelf. Daily readings from the best of world literature.  
 0330 BBC (eu): Europe Today. All the latest news, analysis and comment.  
 0330 BBC (eu): Jazz for the Asking. See S 0630.  
 0330 BBC (south as): Anything Goes. See S 0530.  
 0333 BBC (af): Network Africa. Breakfast show of news, sport, personalities, music, and listener's comments.  
 0345 BBC (as pac): BBC English. See S 1515.

## Tuesdays

- 0305 BBC (am): World Business Report. See M 1205.

- 0305 BBC (as pac): World Business Report. See M 1205.  
 0315 BBC (af): Sports Roundup. See S 0315.  
 0315 BBC (am): Sports Roundup. See S 0315.  
 0315 BBC (as pac): Sports Roundup. See S 0315.  
 0315 BBC (eu): Sports Roundup. See S 0315.  
 0315 BBC (south as): Sports Roundup. See S 0315.  
 0330 BBC (am): The World Today. See M 1645.  
 0330 BBC (as pac): Off the Shelf. See M 0330.  
 0330 BBC (eu): Europe Today. See M 0330.  
 0330 BBC (eu): John Peel. See S 0530.  
 0330 BBC (south as): John Peel. See S 0530.  
 0333 BBC (af): Network Africa. See M 0333.  
 0345 BBC (am): Development '95. See M 1230.  
 0345 BBC (as pac): BBC English. See S 1515.

## Wednesdays

- 0305 BBC (am): World Business Report. See M 1205.  
 0305 BBC (as pac): World Business Report. See M 1205.  
 0315 BBC (af): Sports Roundup. See S 0315.  
 0315 BBC (am): Sports Roundup. See S 0315.  
 0315 BBC (as pac): Sports Roundup. See S 0315.  
 0315 BBC (eu): Sports Roundup. See S 0315.  
 0315 BBC (south as): Sports Roundup. See S 0315.  
 0330 BBC (am): The World Today. See M 1645.  
 0330 BBC (as pac): Off the Shelf. See M 0330.  
 0330 BBC (eu): Discovery. See T 0230.  
 0330 BBC (eu): Europe Today. See M 0330.  
 0330 BBC (south as): Discovery. See T 0230.  
 0333 BBC (af): Network Africa. See M 0333.  
 0345 BBC (am): Variable Feature. See S 0115.  
 0345 BBC (as pac): BBC English. See S 1515.

## Thursdays

- 0305 BBC (am): World Business Report. See M 1205.  
 0305 BBC (as pac): World Business Report. See M 1205.  
 0315 BBC (af): Sports Roundup. See S 0315.  
 0315 BBC (am): Sports Roundup. See S 0315.  
 0315 BBC (as pac): Sports Roundup. See S 0315.  
 0315 BBC (eu): Sports Roundup. See S 0315.  
 0315 BBC (south as): Sports Roundup. See S 0315.  
 0330 BBC (am): The World Today. See M 1645.  
 0330 BBC (as pac): Off the Shelf. See M 0330.

- 0330 BBC (eu): Assignment. See H 0130.  
 0330 BBC (eu): Europe Today. See M 0330.  
 0330 BBC (south as): Assignment. See H 0130.  
 0333 BBC (af): Network Africa. See M 0333.  
 0345 BBC (am): Variable Feature. See S 0115.  
 0345 BBC (as pac): BBC English. See S 1515.

## Fridays

- 0305 BBC (am): World Business Report. See M 1205.  
 0305 BBC (as pac): World Business Report. See M 1205.  
 0315 BBC (af): Sports Roundup. See S 0315.  
 0315 BBC (am): Sports Roundup. See S 0315.  
 0315 BBC (as pac): Sports Roundup. See S 0315.  
 0315 BBC (eu): Sports Roundup. See S 0315.  
 0315 BBC (south as): Sports Roundup. See S 0315.  
 0330 BBC (am): The World Today. See M 1645.  
 0330 BBC (as pac): Off the Shelf. See M 0330.  
 0330 BBC (eu): Europe Today. See M 0330.  
 0330 BBC (eu): Focus on Faith. See F 0130.  
 0330 BBC (south as): Focus on Faith. See F 0130.  
 0333 BBC (af): Network Africa. See M 0333.  
 0345 BBC (am): Variable Feature. See S 0115.  
 0345 BBC (as pac): BBC English. See S 1515.

## Saturdays

- 0305 BBC (am): World Business Report. See M 1205.  
 0305 BBC (as pac): World Business Report. See M 1205.  
 0315 BBC (af): Sports Roundup. See S 0315.  
 0315 BBC (am): Sports Roundup. See S 0315.  
 0315 BBC (as pac): Sports Roundup. See S 0315.  
 0315 BBC (eu): Sports Roundup. See S 0315.  
 0315 BBC (south as): Sports Roundup. See S 0315.  
 0330 BBC (am): The World Today. See M 1645.  
 0330 BBC (as pac): The Vintage Chart Show. See W 1215.  
 0330 BBC (eu): Europe Today. See M 0330.  
 0330 BBC (south as): The Vintage Chart Show. See W 1215.  
 0331 BBC (af): African Quiz (biweekly). Test your knowledge of Africa.  
 0331 BBC (af): This Week in Africa (biweekly). A roundup of the week's political developments across the continent.  
 0345 BBC (am): Global Concerns. See M 0145.

## FREQUENCIES

0400-0500	Australia, Radio	9580pa	9660pa	13605as	15240pa	0400-0430	Tanzania, Radio	5050af			
		15365pa	15415pa	17750as	17795pa	0400-0415	Uganda, Radio	4976do	5026do		
		17860pa				0400-0500	United Kingdom, BBC London	3255af	5975na	6005af	6190af
0400-0500 vl	Australia, VL8A Alice Spg	4835do						3110me	9585eu	9600af	11730af
0400-0500 vl	Australia, VL8K Katherine	5025do						11760as	12095af	15280as	15310as
0400-0500 vl	Australia, VL8T Tent Crk	4910do						15575me	17790as		
0400-0500	Bahrain, Radio	6010do				0400-0415	United Kingdom, BBC London	9610af			
0400-0500	Bulgaria, Radio	7335na	9700na			0400-0430	United Kingdom, BBC London	6175na			
0400-0500	Canada, CFCX Montreal	6005do				0400-0500	USA, KALJ Dallas TX	5810am	9815am		
0400-0500	Canada, CFRX Toronto	6070do				0400-0500	USA, KTNB Salt Lk City UT	7510am			
0400-0500	Canada, CFVP Calgary	6030do				0400-0500	USA, KVOH Los Angeles CA	9785na			
0400-0500	Canada, CHNX Halifax	6130do				0400-0500	USA, KWHR Naalehu HI	9930as			
0400-0500	Canada, CKZN St John's	6160do				0400-0500	USA, Monitor Radio Intl	7535eu	9840af		
0400-0500	Canada, CKZU Vancouver	6160do				0400-0500	USA, VOA Washington DC	5995eu	6040eu	6140af	6873af
0400-0430	Canada, RCI Montreal	6150me	9505me	9670me				7170me	7280af	7340af	7405ca
0400-0500	China, China Radio Intl	9730na						9575af	9885af		
0400-0500	Costa Rica, R Peace Intl	7385am	9400am			0400-0500	USA, WEWN Birmingham AL	7425na			
0400-0500	Cuba, Radio Havana Cuba	6000na	6180na	9820na	9830na	0400-0500	USA, WHRI Noblesville IN	5745am	9495am	9930am	
0400-0430	Ecuador, HCJB Quito	9745am	15540am	21455am		0400-0500	USA, WINB Red Lion PA	11950eu			
0400-0450	Germany, Deutsche Welle	6015af	6065af	7160af	7225af	0400-0500	USA, WJCR Upton KY	7490na	13595na		
		7265as	9565af	9765af		0400-0500 smtwhf	USA, WMLK Bethel PA	9465eu			
0400-0500 tvtrfa	Guatemala, Radio Cultural	3300do				0400-0500	USA, WRNO New Orleans LA	7395am			
0400-0500	Kenya, Kenya Broadc Corp	4885do	4935do			0400-0500	USA, WVHA Green Bush ME	7465eu			
0400-0500 s	Lebanon, Wings of Hope	9960me				0400-0500	USA, WWCR Nashville TN	5065am	5935am	7435am	
0400-0500 smtwh	Malaysia, Radio	7295do				0400-0445	USA, WYFR Okeechobee FL	6065na	9505na		
0400-0425	Netherlands, Radio	6015na	6165na			0400-0459	USA, WYFR Okeechobee FL	9770eu			
0400-0458	New Zealand, R NZ Intl	15115pa				0400-0500	Vietnam, Voice of	5940na	7400na		
0400-0500 vl	Papua New Guinea, NBC	4890do	9675do			0400-0500	Zimbabwe, ZBC/Radio 3	3306do	3396do		
0400-0430	Romania, R Romania Intl	5990na	6155na	9510na	9570na	0415-0440	Italy, RAI Rome	5990me	7275eu		
		11940na				0425-0500	Nigeria, FRCN/Radio	3326do	4990do		
0400-0500	Russia, Voice of	5905eu	5940na	6035eu	7105na	0430-0500	Australia, AF Radio	13525as			
		7180na	7270na	7300na	9705na	0430-0500	Russia, Voice of	4975as	6000as	9785eu	9865eu
		9825na	15295na					11765as	15360as	17620as	17675as
0400-0500	S Africa, Channel Africa	5955af	9585af	15240af		0430-0500	Swaziland, Trans World R	3200af	5055af	7150af	
0400-0500 vl	Slovakia, AWR	6050as	9465af			0430-0500	Switzerland, Swiss R Intl	9905na			
0400-0430	Sri Lanka, SLBC Colombo	9720as	15425as			0430-0500	USA, VOA Washington DC	6035af	7280af	7340af	9575af
0400-0500	Swaziland, Swazi Radio	6155af				0455-0500	Nigeria, FRCN/Voice of	7255af			
0400-0430	Switzerland, Swiss R Intl	6135na	9885na	9905na		0459-0500	New Zealand, R NZ Intl	9570pa			

## SELECTED PROGRAMS

## Sundays

- 0415 BBC (as pac): A Jolly Good Show. Dave Lee Travis presents your record requests and dedications in his own unique way.
- 0430 BBC (am): Science in Action. The latest in science and technology.
- 0430 BBC (eu): Short Story. Variable dramas.
- 0430 BBC (eu): Weekend. European magazine program co-produced by European broadcasters.
- 0430 BBC (south as): Short Story. See S 0430.
- 0435 BBC (af): Education Express. Examining the issues affecting Africa's students and teachers.
- 0445 BBC (eu): Variable Music Feature. See S 0015.
- 0445 BBC (south as): Variable Music Feature. See S 0015.

## Mondays

- 0415 BBC (as pac): The Learning World. See S 0030.
- 0430 BBC (as pac): John Peel. See S 0530.
- 0430 BBC (eu): Europe Today. See M 0330.
- 0430 BBC (eu): Off the Shelf. See M 0330.
- 0430 BBC (south as): Off the Shelf. See M 0330.
- 0433 BBC (af): Network Africa. See M 0333.
- 0445 BBC (am): Health Matters. Keeps track of new developments in the world of medical science, as well as ways of keeping fit.
- 0445 BBC (eu): Variable Feature. See S 0115.
- 0445 BBC (south as): Variable Feature. See S 0115.

## Tuesdays

- 0415 BBC (as pac): The World Today. See M 1645.
- 0430 BBC (am): Outlook. See M 1405.
- 0430 BBC (as pac): Variable Feature. See S 0115.
- 0430 BBC (eu): Short Story. See S 0430.
- 0430 BBC (eu): Weekend. See S 0430.
- 0430 BBC (south as): Off the Shelf. See M 0330.
- 0433 BBC (af): Network Africa. See M 0333.
- 0445 BBC (as pac): On Screen. See S 1215.
- 0445 BBC (eu): On Screen. See S 1215.
- 0445 BBC (south as): On Screen. See S 1215.

## Wednesdays

- 0415 BBC (as pac): The World Today. See M 1645.
- 0430 BBC (am): Outlook. See M 1405.
- 0430 BBC (as pac): Variable Comedy/Quiz Feature. See S 1530.

- 0430 BBC (eu): Europe Today. See M 0330.
- 0430 BBC (eu): Off the Shelf. See M 0330.
- 0430 BBC (south as): Off the Shelf. See M 0330.
- 0433 BBC (af): Network Africa. See M 0333.
- 0445 BBC (eu): Country Style. See S 1445.
- 0445 BBC (south as): Country Style. See S 1445.

## Thursdays

- 0415 BBC (as pac): The World Today. See M 1645.
- 0430 BBC (am): Outlook. See M 1405.
- 0430 BBC (as pac): Megamix. See T 1615.
- 0430 BBC (eu): Europe Today. See M 0330.
- 0430 BBC (eu): Off the Shelf. See M 0330.
- 0430 BBC (south as): Off the Shelf. See M 0330.
- 0433 BBC (af): Network Africa. See M 0333.
- 0445 BBC (eu): From Our Own Correspondent. See S 0130.
- 0445 BBC (south as): From Our Own Correspondent. See S 0130.

## Fridays

- 0415 BBC (as pac): The World Today. See M 1645.
- 0430 BBC (am): Outlook. See M 1405.
- 0430 BBC (as pac): Waveguide. See S 0350.
- 0430 BBC (eu): Europe Today. See M 0330.
- 0430 BBC (eu): Off the Shelf. See M 0330.
- 0430 BBC (south as): Off the Shelf. See M 0330.
- 0433 BBC (af): Network Africa. See M 0333.
- 0445 BBC (as pac): Folk Routes. See T 0030.
- 0445 BBC (eu): Folk Routes. See T 0030.
- 0445 BBC (south as): Folk Routes. See T 0030.

## Saturdays

- 0415 BBC (as pac): The World Today. See M 1645.
- 0430 BBC (am): Outlook. See M 1405.
- 0430 BBC (as pac): Science in Action. See S 0430.
- 0430 BBC (eu): Europe Today. See M 0330.
- 0430 BBC (eu): Jazz Now and Then. See A 0130.
- 0430 BBC (south as): Jazz Now and Then. See A 0130.
- 0431 BBC (af): African Quiz (biweekly). See A 0331.
- 0431 BBC (af): This Week in Africa (biweekly). See A 0331.
- 0445 BBC (eu): Seven Days. See A 0030.
- 0445 BBC (south as): Seven Days. See A 0030.

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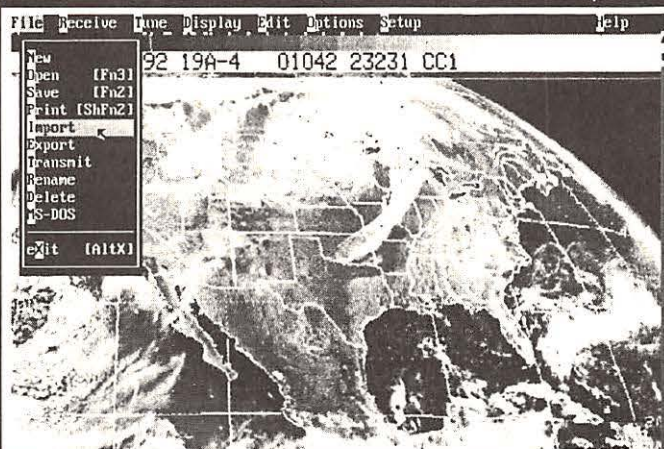
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## FREQUENCIES

0500-0600	Australia, AF Radio	13525as				0500-0530	Switzerland, Swiss R Intl	9885af	13635af	15340af	
0500-0600	Australia, Radio	9580pa	9660pa	13605as	15240pa	0500-0502	Uganda, Radio	4976do			
		15365pa	15415as	17715pa	17750as	0500-0600	United Kingdom, BBC London	3255af	3955eu	5975na	6005af
		17795as	17860pa	17880as				6180eu	6190af	6195eu	9410af
0500-0600 vl	Australia, VL8A Alice Spg	4835do						9600af	9640na	11760as	11955as
0500-0600 vl	Australia, VL8K Katherine	5025do						12095me	15280as	15310as	15360as
0500-0600 vl	Australia, VL8T Tent Crk	4910do						15420af	15575me	17885af	
0500-0600	Bahrain, Radio	6010do				0500-0600	USA, KAIJ Dallas TX	5810am	9815am		
0500-0600	Canada, CFCX Montreal	6005do				0500-0600	USA, KTNB Salt Lk City UT	7510am			
0500-0600	Canada, CFRX Toronto	6070do				0500-0600	USA, KVOH Los Angeles CA	9785am			
0500-0600	Canada, CFVP Calgary	6030do				0500-0600	USA, KWHR Naalehu HI	9930as			
0500-0600	Canada, CHNX Halifax	6130do				0500-0600	USA, Monitor Radio Intl	7535eu			
0500-0600	Canada, CKZU Vancouver	6160do				0500-0600	USA, VOA Washington DC	5995eu	6035af	6040eu	6140af
0500-0600	China, China Radio Intl	9595na						6873af	7170me	7405af	9530eu
0500-0600	Costa Rica, AWR Alajuela	6150am						9665af	9700eu	11825me	12080af
0500-0600	Costa Rica, R Peace Intl	7385am	9400am					15205me			
0500-0600	Cuba, Radio Havana Cuba	9820na	9830na			0500-0600	USA, WEWN Birmingham AL	7425na			
0500-0600	Ecuador, HCJB Quito	9745na				0500-0600	USA, WHRI Noblesville IN	7315na	9495am	9930am	
0500-0600 as	Eq Guinea, R East Africa	9585af				0500-0600	USA, WINB Red Lion PA	11950na			
0500-0550	Germany, Deutsche Welle	5960na	6045na	6120na	6185na	0500-0600	USA, WJCR Upton KY	7490na	13595na		
0500-0515	Israel, Kol Israel	7465na	9435na	17545as		0500-0600 mtwhfa	USA, WMLK Bethel PA	9465eu			
0500-0600 mtwh/vl	Italy, IRRS Milan	7125va				0500-0600	USA, WRNO New Orleans LA	7395am			
0500-0600	Japan, NHK/Radio	5975eu	6025na	7230eu	9565as	0500-0600	USA, WVHA Green Bush ME	7465eu			
		11740as	11885na	15410as	17810as	0500-0600	USA, WWCR Nashville TN	5065am	5935am	7435am	
0500-0600	Kenya, Kenya Broad Corp	4885do	4935do			0500-0600	USA, WYFR Okeechobee FL	5985na			
0500-0600 s	Lebanon, Wings of Hope	9960me				0500-0545	USA, WYFR Okeechobee FL	9850eu			
0500-0600	New Zealand, R NZ Intl	9570pa				0500-0530	Vatican State, Vatican R	5865af	7360af	9725af	11625af
0500-0505	Nigeria, FRCN/Radio	3326do	4990do			0500-0520	Vatican State, Vatican R	4010eu			
0500-0600	Nigeria, FRCN/Voice of	7255af				0500-0600	Vietnam, Voice of	5940na	7400na		
0500-0530 m	Norway, Radio Norway Intl	5905na	5910na			0500-0600	Zimbabwe, ZBC/Radio 3	3306do	3396do		
0500-0600 vl	Papua New Guinea, NBC	4890do	9675do			0525-0600	Ghana, Ghana Broad Corp	3366do	4915do		
0500-0600	Russia, Voice of	5905eu	5930eu	7105na	7175eu	0530-0600	Australia, Radio	9660do	15510as	15565as	17715as
		7270na	7345na	9705as	9850na			17860pa	17880as		
		9865as	9895as	17890as		0530-0600	Austria, R Austria Intl	6015na			
0500-0600	S Africa, Channel Africa	7185af	11900af			0530-0600	Finland, YLE/Radio	6120eu	9635af	11755me	
0500-0545 f	Seychelles, FEBA Radio	15555me				0530-0600	Romania, R Romania Intl	11940af	15250af	15380af	17745af
0500-0600 vl	Slovakia, AWR	9465af						17790af			
0500-0600	Spain, R Exterior Espana	9540na				0530-0600	Russia, Voice of	5930as	11710as		
0500-0600	Swaziland, Swazi Radio	6155af				0530-0600	Swaziland, Trans World R	9500af	9650af		
0500-0530	Swaziland, Trans World R	5055af	6070af	7150af	7200af	0530-0600	United Kingdom, BBC London	11735eu			
		9500af				0535-0600	Swaziland, Trans World R	6070af			
0500-0515	Switzerland, Swiss R Intl	3985eu	6165eu								

## SELECTED PROGRAMS

## Sundays

- 0510 BBC (south as): Variable Feature. See S 0115.  
 0530 BBC (am): John Peel. Tracks from newly released albums and singles from the contemporary music scene.  
 0530 BBC (as pac): Anything Goes. A variety of music and much more with Bob Holness.  
 0530 BBC (eu): In Praise of God. See S 0230.  
 0535 BBC (af): Postmark Africa. See S 0335.  
 0555 BBC (south as): Words of Faith. People of all faiths share how their scripture gives authority and meaning to their lives.

## Mondays

- 0510 BBC (south as): The John Dunn Show. See S 0330.  
 0530 BBC (am): Variable Feature. See S 0115.  
 0530 BBC (as pac): Variable Feature. See S 0115.  
 0530 BBC (eu): Anything Goes. See S 0530.  
 0533 BBC (af): Network Africa. See M 0333.  
 0540 BBC (south as): On the Move. See S 0615.  
 0555 BBC (south as): Words of Faith. See S 0555.

## Tuesdays

- 0510 BBC (south as): A Jolly Good Show. See S 0415.  
 0530 BBC (am): Multitrack: Hit List. See M 1615.  
 0530 BBC (as pac): Discovery. See T 0230.  
 0530 BBC (eu): Variable Feature. See S 0115.  
 0533 BBC (af): Network Africa. See M 0333.  
 0545 BBC (eu): On the Move. See S 0615.  
 0555 BBC (south as): Words of Faith. See S 0555.

## Wednesdays

- 0510 BBC (south as): Concert Hall. See S 1415.  
 0530 BBC (am): Megamix. See T 1615.  
 0530 BBC (as pac): Omnibus. See M 1130.  
 0530 BBC (eu): Omnibus. See M 1130.  
 0533 BBC (af): Network Africa. See M 0333.  
 0555 BBC (south as): Words of Faith. See S 0555.

## Thursdays

- 0510 BBC (south as): The Greenfield Collection. See S 1615.  
 0530 BBC (am): Multitrack: X-Press. See W 1615.

- 0530 BBC (as pac): Assignment. See H 0130.  
 0530 BBC (eu): The Learning World. See S 0030.  
 0533 BBC (af): Network Africa. See M 0333.  
 0545 BBC (eu): Variable Music Feature. See S 0015.  
 0555 BBC (south as): Words of Faith. See S 0555.

## Fridays

- 0510 BBC (south as): Music Review. See S 1415.  
 0530 BBC (am): Andy Kershaw's World of Music. See S 1230.  
 0530 BBC (as pac): Focus on Faith. See F 0130.  
 0530 BBC (eu): Andy Kershaw's World of Music. See S 1230.  
 0533 BBC (af): Network Africa. See M 0333.

- 0555 BBC (south as): Words of Faith. See S 0555.

## Saturdays

- 0510 BBC (south as): Variable Comedy/Quiz Feature. See S 1530.  
 0530 BBC (am): Multitrack: Alternative. See F 1430.  
 0530 BBC (as pac): Composer of the Month. See M 0130.  
 0530 BBC (eu): The John Dunn Show. See S 0330.  
 0531 BBC (af): African Quiz (biweekly). See A 0331.  
 0531 BBC (af): This Week in Africa (biweekly). See A 0331.  
 0540 BBC (south as): Variable Feature. See S 0115.  
 0555 BBC (south as): Words of Faith. See S 0555.

## HAUSER'S HIGHLIGHTS

## USA: WWCR, NASHVILLE,

Selected programs as time-shifted for summer:

## Spectrum

*Sound Currents of the  
Rock the Universe  
The Old Record Shop*

*The Big Backyard  
President & Republicans  
Wolfe Calling  
Latin Catholic Mass  
View from Europe  
World Wide Country  
Radio  
Tempered Steel  
Extraordinary Science  
Radio Hour*

Live 0200 UT Sun 5065, 7435, repeat Mon 0600 on 7435  
 Tue 0600 on 7435, Sat 1405 on 15685 Spirit  
 Thu 0600 on 7435, Sat 2200 on 12160  
 Mon 2045 on 15685, 2100 on 9475;  
 UT Sun 0100 on 7435, UT Mon 0300 on 7435  
 Fri 2045 on 5685, 2100 on 9475  
 Sat 1900 on 15685, 2245 on 9475  
 Sun 0500 on 7435, Mon 0330 on 7435  
 Sun 1600 on 15685  
 Sun 1805 on 15685  
 Mon-Fri 1600-2000 on 12160, Sun 1900-2100  
 and 2200-2300 on 12160  
 Sun 0500 on 5065  
 Mon 0300 on 5065

## FREQUENCIES

0600-0630	Australia, AF Radio	13525as				0600-0700	South Korea, R Korea Intl	11945na			
0600-0700	Australia, Radio	9660do	11910pa	13755pa	15510as	0600-0700	Swaziland, Swazi Radio	6155af			
		17715as	17880as			0600-0700	Swaziland, Trans World R	5055af	6070af	9500af	9650af
0600-0630	Australia, Radio	13605as				0600-0630	Switzerland, Swiss R Intl	3985eu	6165eu		
0600-0700 vl	Australia, VL8A Alice Spg	4835do				0600-0615 s	Uganda, Radio	4976do	7110do		
0600-0700 vl	Australia, VL8T Katherine	5025do				0600-0700	United Kingdom, BBC London	3955eu	6005af	6190af	6195eu
0600-0700 vl	Australia, VL8T Tent Crk	4910do						9410af	9600af	9640na	11760as
0600-0700	Bahrain, Radio	6010do						11780eu	11940af	11955as	12095me
0600-0700	Canada, CFCX Montreal	6005do						15070af	15280as	15310as	15360me
0600-0700	Canada, CFRX Toronto	6070do						15400af	15420af	15575af	17790as
0600-0700	Canada, CFVP Calgary	6030do									
0600-0700	Canada, CHNX Halifax	6130do				0600-0630	17885af				
0600-0700	Canada, CKZU Vancouver	6160do				0600-0700	United Kingdom, BBC London	6180eu			
0600-0630 mtwhf	Canada, RCI Montreal	6050eu	6150eu	9760eu	11905me	0600-0700	USA, KAIJ Dallas TX	5810am	13740am		
0600-0700	Costa Rica, R Peace Intl	7385am	9400am			0600-0700	USA, KTVN Salt Lk City UT	7510am			
0600-0700	Cuba, Radio Havana Cuba	9820na				0600-0700	USA, KVOH Los Angeles CA	9785am			
0600-0630	Czech Rep, Radio Prague	5930eu	7345eu	9505eu		0600-0700	USA, KWHR Naalehu HI	9930as			
0600-0700	Ecuador, HCJB Quito	9745na				0600-0700	USA, Monitor Radio Intl	7535eu			
0600-0700 as	Eqt Guinea, R East Africa	9585af				0600-0700	USA, VOA Washington DC	3980eu	5995eu	6035af	6040eu
0600-0650	Germany, Deutsche Welle	6100af	9565af	11765af	13790af			6060eu	6140af	6873eu	7170me
		15185af	17820af	21705af				7325me	7405af	9530af	9665af
		3316do	4915do					11805af	11825af	11950af	12035af
0600-0615	Ghana, Ghana Broadc Corp	7125va						12080af	15205me	15600af	
0600-0700 mtwh/vl	Italy, IRRS Milan	11860as	21610as			0600-0700	USA, WEWN Birmingham AL	6065eu	7425na		
0600-0700	Japan, NHK/Radio	4885do	4935do			0600-0700	USA, WHRI Noblesville IN	7315am	9495am	9930am	
0600-0700	Kenya, Kenya Broadc Corp	9825do				0600-0700	USA, WINB Red Lion PA	11950na			
0600-0700 vl	Kiribati, Radio	9960me				0600-0700	USA, WJCR Upton KY	7490na	13595na		
0600-0700 s	Lebanon, Wings of Hope	7275do				0600-0700 smtwhf	USA, WMLK Bethel PA	9465eu			
0600-0700 vl	Liberia, Radio ELBC	4760do				0600-0700	USA, WVHA Green Bush ME	7455eu			
0600-0700	Liberia, Radio ELWA	7295do				0600-0700	USA, WWCR Nashville TN	5065am	5935am	7435am	
0600-0700 asmtwh	Malaysia, Radio	6175as	9750as	15295as		0600-0700	USA, WYFR Okeechobee FL	5985na	7355eu	9680eu	9850af
0600-0700	Malaysia, Voice of	9765me				0600-0700	Zimbabwe, ZBC/Radio 3	5975do	6045do		
0600-0700	Malta, V of Mediterranean	9570pa				0604-0700	S Africa, Trans World R	11730af			
0600-0700	New Zealand, R NZ Intl	3326do	4990do			0630-0700	Australia, Radio	9580pa	9860pa	11880pa	15415as
0600-0630	Nigeria, FRCN/Radio	7255af						21725as			
0600-0700	Nigeria, FRCN/Voice of	4890do	9675do			0630-0700	Austria, R Austria Intl	6015na			
0600-0700 vl	Papua New Guinea, NBC	5905eu	5930eu	7175na	7270na	0630-0700	Belgium, R Vlaanderen Int	5985eu	9925au		
0600-0700	Russia, Voice of	7345na	9850as	9895as	11710na	0631-0640	Romania, R Romania Intl	7105eu	7175eu	9510eu	11775eu
		17620as	17890as			0640-0700 mtwhfs	Monaco, Trans World Radio	7115eu			
0600-0700 vl	Slovakia, AWR	13715af				0640-0700	Vatican State, Vatican R	5865af	7360af	9660af	11625af
0600-0630 vl	Solomon Islands, SIBC	5020do	9545do			0645-0700	Romania, R Romania Intl	15205pa	15335pa	17720pa	17805pa

## SELECTED PROGRAMS

## Sundays

- 0615 BBC (af): Letter from America. See S 0030.  
 0615 BBC (am): On the Move. A weekly program about travel and transport with Malcolm Billings.  
 0615 BBC (as pac): Letter from America. See S 0030.  
 0615 BBC (eu): Letter from America. See S 0030.  
 0615 BBC (south as): Letter from America. See S 0030.  
 0630 BBC (am): Meridian. Three topical programmes weekly about the world of the arts.  
 0630 BBC (as pac): Jazz for the Asking. Record requests with Malcolm Laylock.  
 0630 BBC (eu): Jazz for the Asking. See S 0630.  
 0630 BBC (south as): Jazz for the Asking. See S 0630.  
 0631 BBC (af): African Perspective. Feature or discussion analyzing a major issue.

## Mondays

- 0615 BBC (af): Network Africa. See M 0333.  
 0615 BBC (am): Concert Hall. See S 1415.  
 0615 BBC (as pac): Country Style. See S 1445.  
 0615 BBC (eu): Variable Feature. See S 0115.  
 0615 BBC (south as): The Learning World. See S 0030.  
 0630 BBC (as pac): Variable Feature. See S 0115.  
 0630 BBC (eu): Variable Feature. See S 0115.  
 0630 BBC (south as): Variable Feature. See S 0115.  
 0633 BBC (af): Network Africa. See M 0333.

## Tuesdays

- 0615 BBC (af): Network Africa. See M 0333.  
 0615 BBC (am): Variable Music Feature. See S 0015.  
 0615 BBC (as pac): Health Matters. See M 0445.  
 0615 BBC (eu): The World Today. See M 1645.  
 0615 BBC (south as): The World Today. See M 1645.  
 0630 BBC (am): Variable Feature. See S 0115.

- 0630 BBC (as pac): Variable Music Feature. See S 0015.  
 0630 BBC (eu): Variable Music Feature. See S 0015.  
 0630 BBC (south as): Variable Music Feature. See S 0015.  
 0633 BBC (af): Network Africa. See M 0333.

## Wednesdays

- 0615 BBC (af): Network Africa. See M 0333.  
 0615 BBC (am): Variable Music Feature. See S 0015.  
 0615 BBC (as pac): Variable Feature. See S 0115.  
 0615 BBC (eu): The World Today. See M 1645.  
 0615 BBC (south as): The World Today. See M 1645.  
 0630 BBC (as pac): Meridian. See S 0630.  
 0630 BBC (eu): Megamix. See T 1615.  
 0630 BBC (south as): Meridian. See S 0630.  
 0633 BBC (af): Network Africa. See M 0333.

## Thursdays

- 0615 BBC (af): Network Africa. See M 0333.  
 0615 BBC (am): A Jolly Good Show. See S 0415.  
 0615 BBC (as pac): Variable Feature. See S 0115.  
 0615 BBC (eu): The World Today. See M 1645.  
 0615 BBC (south as): The World Today. See M 1645.  
 0630 BBC (as pac): Sports International. See H 0230.  
 0630 BBC (eu): Sports International. See H 0230.  
 0630 BBC (south as): Sports International. See H 0230.  
 0633 BBC (af): Network Africa. See M 0333.

## Fridays

- 0615 BBC (af): Network Africa. See M 0333.  
 0615 BBC (am): Country Style. See S 1445.  
 0615 BBC (as pac): On the Move. See S 0615.  
 0615 BBC (eu): The World Today. See M 1645.  
 0615 BBC (south as): The World Today. See M 1645.  
 0630 BBC (am): Meridian. See S 0630.  
 0630 BBC (as pac): Meridian. See S 0630.

- 0630 BBC (eu): Variable Feature. See S 0115.  
 0630 BBC (south as): Meridian. See S 0630.  
 0633 BBC (af): Network Africa. See M 0333.

## Saturdays

- 0615 BBC (af): Seven Days. See A 0030.  
 0615 BBC (am): From the Weeklies. See A 0030.  
 0615 BBC (as pac): From the Weeklies. See A 0030.  
 0615 BBC (eu): The World Today. See M 1645.  
 0615 BBC (south as): The World Today. See M 1645.  
 0630 BBC (am): People and Politics. See S 0130.  
 0630 BBC (as pac): Meridian. See S 0630.  
 0630 BBC (eu): Focus on Faith. See F 0130.  
 0630 BBC (south as): Meridian. See S 0630.  
 0631 BBC (af): Talkabout Africa. See W 1615.

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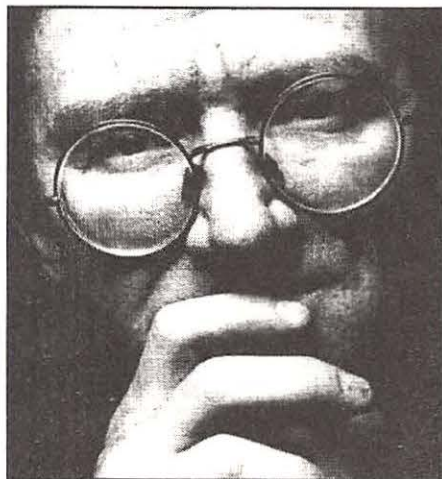
## FREQUENCIES

0700-0800	Australia, Radio	6020pa	6080pa	9580pa	9710pa	0800-0900	Bahrain, Radio	6010do			
		9860pa	11720pa	11880pa	11910pa	0800-0900	Canada, CFCX Montreal	6005do			
		13605pa	15240pa	15565as	17695as	0800-0900	Canada, CFRX Toronto	6070do			
		17750as	21595as	21715as		0800-0900	Canada, CFVP Calgary	6030do			
0700-0730	Australia, Radio	15415as	17795as			0800-0900	Canada, CHNX Halifax	6130do			
0700-0800 vl	Australia, VLBA Alice Spg	4835do				0800-0900	Canada, CKZU Vancouver	6160do			
0700-0800 vl	Australia, VL8K Katherine	5025do				0800-0900	Costa Rica, R Peace Intl	9400am			
0700-0800 vl	Australia, VL8T Tent Crk	4910do				0800-0830	Ecuador, HCJB Quito	9600eu	9745pa	11835eu	11925pa
0700-0800	Bahrain, Radio	6010do						21455eu			
0700-0800	Canada, CFCX Montreal	6005do				0800-0900 as	Egt Guinea, R East Africa	9585af			
0700-0800	Canada, CFRX Toronto	6070do				0800-0805 s	Ghana, Ghana Broadc Corp	3366do			
0700-0800	Canada, CFVP Calgary	6030do				0800-0900	Guam, TWR/KTWR	15200as			
0700-0800	Canada, CHNX Halifax	6130do				0800-0900 mtwh/vl	Italy, IRRS Milan	7125va			
0700-0800	Canada, CKZU Vancouver	6160do				0800-0900	Kenya, Kenya Broadc Corp	4885do	4935do		
0700-0800	Costa Rica, R Peace Intl	7385am	9400am			0800-0900 vl	Kiribati, Radio	9825do			
0700-0800	Ecuador, HCJB Quito	6135pa	6205as	9420eu	9600eu	0800-0900 vl	Liberia, Radio ELBC	7275do			
		9745pa	11835eu	11925pa	17490pa	0800-0830	Liberia, Radio ELWA	4760do			
		21455eu				0800-0900	Malaysia, Radio	7295do			
0700-0800 as	Egt Guinea, R East Africa	9585af				0800-0830	Malaysia, Voice of	7175as	9750as	15295as	
0700-0715	Ghana, Ghana Broadc Corp	3366do	4915do			0800-0820 mtwhfs	Monaco, Trans World Radio	7115eu			
0700-0800 mtwh/vl	Italy, IRRS Milan	7125va				0800-0805 a	Monaco, Trans World Radio	7115eu			
0700-0800	Japan, NHK/Radio	5975eu	7230eu	11740as	15270as	0800-0825	Netherlands, Radio	9720pa	11895pa		
		15335me	15410as	17810me	21610au	0800-0900	New Zealand, R NZ Intl	6100pa			
0700-0800	Kenya, Kenya Broadc Corp	4885do	4935do			0800-0830 m	Norway, Radio Norway Intl	9590pa	15175as		
0700-0800 vl	Kiribati, Radio	9825do				0800-0850	Pakistan, Radio	15625eu	17900eu		
0700-0800 vl	Liberia, Radio ELBC	7275do				0800-0900 vl	Papua New Guinea, NBC	4890do	9675do		
0700-0800	Liberia, Radio ELWA	4760do				0800-0900	Russia, Voice of	11710as	15230me	17620na	17840as
0700-0800 asmtwh	Malaysia, Radio	7295do						17890as			
0700-0800	Malaysia, Voice of	6175as	9750as	15295as		0800-0815	Sierra Leone, SLBS	3316do			
0700-0800	Monaco, Trans World Radio	7115eu				0800-0900 vl	Slovakia, AWR	17630af			
0700-0730	Myanmar, Radio	5990do	9730do			0800-0900 vl	Solomon Islands, SIBC	5020do	9545do		
0700-0716	New Zealand, R NZ Intl	9570pa				0800-0900	South Korea, R Korea Intl	7550eu	13670eu		
0700-0800 vl	Papua New Guinea, NBC	4890do	9675do			0800-0805 smtwhf	Swaziland, Trans World R	5055af	6070af	9500af	9650af
0700-0715	Romania, R Romania Intl	15205pa	15335pa	17720pa	17805pa	0800-0900	United Kingdom, BBC London	6190af	6195eu	7325eu	9740as
0700-0800	Russia, Voice of	5905eu	5930eu	7175na	7270na			11940af	11955as	12095af	15070af
		9700as	9850as	11675eu	15385me			15280as	15360as	15400af	17640af
		17840af						17830af	17885af		
0700-0715	Sierra Leone, SLBS	3316do				0800-0815	United Kingdom, BBC London	3955eu	9410eu	9600af	9640na
0700-0800 vl	Solomon Islands, SIBC	5020do	9545do					11760me	15310eu	17790as	
0700-0800	Swaziland, Swazi Radio	6155af				0800-0900	USA, KAIJ Dallas TX	5810am	13740am		
0700-0735	Swaziland, Trans World R	5055af	6070af	9500af	9650af	0800-0900	USA, KNLS Anchor Point AK	9615as			
0700-0800	Taiwan, VO Free China	5950na				0800-0900	USA, KTNB Salt Lk City UT	7510am			
0700-0715 mtwfta	Uganda, Radio	4976do	7110do			0800-0900	USA, KWHR Naalehu HI	9930as			
0700-0800	United Kingdom, BBC London	3955eu	6190af	6195eu	7325eu	0800-0900	USA, Monitor Radio Intl	7535eu	9425pa		
		9410af	9600af	9640na	11760me	0800-0900	USA, WEWN Birmingham AL	5975na	9350na		
		11940af	11955as	12095af	15070af	0800-0900	USA, WHRI Noblesville IN	7315am	9495am	9930am	
		15280as	15310as	15360as	15400af	0800-0900	USA, WINB Red Lion PA	11950na			
		17790as	17830af	17885af		0800-0900	USA, WJCR Upton KY	7490na	13595na		
0700-0730	United Kingdom, BBC London	6005eu	11780eu	11860af	15575me	0800-0900 smtwhf	USA, WMLK Bethel PA	9465eu			
0700-0800	USA, KAIJ Dallas TX	5810am	13740am			0800-0900	USA, WWCR Nashville TN	5065am	5935am		
0700-0800	USA, KTNB Salt Lk City UT	7510am				0800-0900	Zimbabwe, ZBC/Radio 4	5975do	6045do	7285do	
0700-0800	USA, KVOH Los Angeles CA	9785am				0803-0810 s	Croatia, Croatian Radio	5895eu	7370eu	9830eu	13830eu
0700-0800	USA, KWHR Naalehu HI	9930as				0815-0900 mtwtf	Nigeria, FRCN/Radio	3326do	4990do		
0700-0800	USA, Monitor Radio Intl	7535eu				0830-0900 vl	Australia, VLBA Alice Spg	2310do			
0700-0800	USA, WEWN Birmingham AL	7425na				0830-0900 vl	Australia, VL8K Katherine	2485do			
0700-0800	USA, WHRI Noblesville IN	7315am	9495am	9930am		0830-0900 vl	Australia, VL8T Tent Crk	2325do			
0700-0800	USA, WINB Red Lion PA	11950na				0830-0900	Ecuador, HCJB Quito	6135pa	9745pa	17490pa	
0700-0800	USA, WJCR Upton KY	7490na	13595na			0830-0900	Netherlands, Radio	9720pa	9895pa	13700pa	
0700-0800 smtwhf	USA, WMLK Bethel PA	9465eu				0830-0900	Slovakia, R Slovakia Intl	11990au	17485au	21705au	
0700-0800	USA, WVHA Green Bush ME	7455eu				0855-0900	Guam, TWR/KTWR	11830pa			
0700-0800	USA, WWCR Nashville TN	5065am	5935as	7435am							
0700-0745	USA, WYFR Okeechobee FL	7355eu	9680eu	9850af							
0700-0800	Zimbabwe, ZBC/Radio 3	5975do	6045do								
0702-0800 as	New Zealand, R NZ Intl	6100pa									
0703-0710 mtwhfa	Croatia, Croatian Radio	5895eu	7370eu	9830eu	13830eu						
0717-0800 mtwhf	New Zealand, R NZ Intl	6100pa									
0730-0800	Australia, Radio	9660pa	17880as								
0730-0800	Austria, R Austria Intl	6155eu	13730eu								
0730-0800 mtwhfa	Austria, R Austria Intl	15410me	17870me								
0730-0800	Czech Rep, Radio Prague	17485as	21705as								
0730-0800	Georgia, Radio	11805eu									
0730-0745 sh	Greece, Voice of	9425eu	9935eu	11645eu							
0730-0800	Netherlands, Radio	9720pa	11895pa								
0730-0745 mtwhf	Vatican State, Vatican R	4010eu	7250eu	9645eu	11740eu						
		15210eu	15570eu								
0735-0800 smtwhf	Swaziland, Trans World R	5055af	6070af	9500af	9650af						
0745-0800	Finland, YLE/Radio	6120eu	9560eu	11755eu							
0745-0800 s	Ghana, Ghana Broadc Corp	3366do	4915do								

*The BBC's new approach to programming (called Splitstreaming) is the strategy of Managing Director, Sam Younger.*

## 0800 UTC

0800-0900	Australia, AF Radio	15607af	18193af		
0800-0900	Australia, Radio	5995pa	6020pa	6080pa	9580pa
		9710pa	9860pa	15565pa	17715as
		17880as			
0800-0830 vl	Australia, VL8A Alice Spg	4835do			
0800-0830 vl	Australia, VL8K Katherine	5025do			
0800-0830 vl	Australia, VL8T Tent Crk	4910do			



*The BBC's new approach to programming (called Splitstreaming) is the strategy of Managing Director, Sam Younger.*

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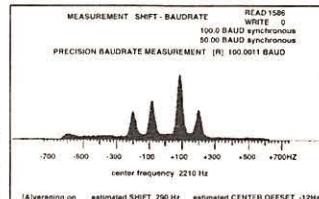
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- SWED-ARQ-ARQ-SWE
- ARQ-E/ARQ1000 Duplex
- ARQ-N-ARQ1000 Duplex Variant
- ARQ-E3-CCIR519 Variant
- POL-ARQ 100 Baud Duplex ARQ
- TDM242/ARQ-M2/4-242
- TDM342/ARQ-M2/4
- FEC-A FEC100A/FEC101
- FEC-S • FEC1000 Simplex
- Sports info 300 baud ASCII
- Hellscreeber-Synch/Asynch
- Sitor RAW (Normal Sitor but without Synch)
- ARQ6-70
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**Atlanta, Ga., Airport Hilton**  
**Oct. 13-15, 1995**



### FRIDAY, October 13, 1995

- 12-4 pm Special interest groups, public education demonstrations, clubs, tours
- 1-2 pm Scanning Atlanta—Roger Cravens
- 2-4 pm International Broadcaster's Forum, Ian McFarland, moderator
- 6-7 pm Media time w/Terrie Kelly host
- 7-7:30 Opening ceremony; greet VIPs (espec. int'l broadcasters) w/Bob Grove host
- 7:30-8:30 MT Expert panel w/Rachel Baughn host
- 8:45-9:45 ST Expert Panel w/Larry Van Horn host

### SATURDAY, October 14, 1995

- |       |             |              |                  |
|-------|-------------|--------------|------------------|
| 9:00  | SW Ute/BC   | Scanner      | Satellite        |
|       | Utility DX  | Public Serv. | Satellite Monit. |
|       | L. Van Horn | Bob Kay      | K. Stein         |
| 10:15 | BC Develop. | Listen. Law  | Weather Sats     |
|       | G. Hauser   | J. Rodriguez | J. Wallach       |
| 11:15 | Lunch       |              |                  |

- 1:00 Begin SW L. Magne
- 2:15 SWBC Prog. J. Frimmel
- 3:15 HF Aero B. Evans
- 4:30 Bug Hunt (outdoors)
- 5:15 Prize drawing
- 7:00 Banquet
- Post banquet bug hunt, listening post, special interest grps.

### SUNDAY, October 15, 1995

- 9:00 AM DXing Begin Scan. Monitor NASA
- TBA TBA B. Grove L. Van Horn
- 10:15 HF Dig. Trunking Amateur Sats
- B. Evans Doug Graham K. Baker
- 11:30 Pirate/Cland VHF Aero Radio Astronomy
- G. Zeller J. Baker J. Lichtman
- 12:45 Close w/Bob Grove host

**Look for exhibits by AMSAT, Bearcat Radio Club, R.L. Drake & Co., ICOM, Optoelectronics, Sony, Swagur and many more top companies!**

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## FREQUENCIES

0900-1000	Australia, AF Radio	15607af	18193af		
0900-1000	Australia, Radio	9510as	9580pa	9860pa	13605as
		15170as	21725as		
0900-1000 vl	Australia, VL8A Alice Spg	2310do			
0900-1000 vl	Australia, VL8K Katherine	2485do			
0900-1000 vl	Australia, VL8T Tent Crk	2325do			
0900-1000	Bahrain, Radio	6010do			
0900-0930 mtwhfa	Belgium, R Vlaanderen Int	6035eu	15510af	17595af	
0900-1000	Bulgaria, Radio	12040au			
0900-1000	Canada, CFCX Montreal	6005do			
0900-1000	Canada, CFRX Toronto	6070do			
0900-1000	Canada, CFVP Calgary	6030do			
0900-1000	Canada, CHNX Halifax	6130do			
0900-1000	Canada, CKZU Vancouver	6160do			
0900-1000	China, China Radio Intl	6950as	11755pa	15440pa	
0900-1000	Costa Rica, R Peace Intl	9400am			
0900-1000	Ecuador, HCJB Quito	6135pa	9745pa	17490pa	21455pa
0900-1000 as	Eqt Guinea, R East Africa	9585af			
0900-1000	Finland, YLE/Radio	15330as	17800au		
0900-0950	Germany, Deutsche Welle	6160as	9565af	11715as	12055as
		15410af	17780as	17800af	21600af
		21650as	21680as		
		3366do	4915do		
0900-0915 mtwtf	Ghana, Ghana Broadc Corp	15200as			
0900-0915	Guam, TWR/KTWR	11830pa			
0900-1000	Guam, TWR/KTWR	13680as			
0900-1000	Iraq, Radio Iraq Intl	7125va			
0900-1000 mtwh/vl	Italy, IRRS Milan	9610as	9750as	11815as	15190as
0900-1000	Japan, NHK/Radio	15270au			
		9825do			
0900-0948 vl	Kiribati, Radio	7275do			
0900-1000 vl	Liberia, Radio ELBC	7295do			
0900-1000	Malaysia, Radio	9720pa	13700pa		
0900-0930	Netherlands, Radio	6100pa			
0900-1000	New Zealand, R NZ Intl	3326do	4990do		
0900-1000 mtwtf	Nigeria, FRCN/Radio	7255af			
0900-1000	Nigeria, FRCN/Voice of	9830as			
0900-1000 mtwffa	Palau, KHBV/Voice of Hope	4890do	9675do		
0900-1000 vl	Papua New Guinea, NBC	9480au	9550eu	11710me	13370as
0900-1000	Russia, Voice of	15580as	17765eu	17795eu	17860as
		9445eu	17630af		
0900-1000 vl	Slovakia, AWR	5020do	9545do		
0900-1000 vl	Solomon Islands, SIBC	9885au	13685au	17515au	
0900-0930	Switzerland, Swiss R Intl	6190af	6195as	9410eu	9740as
0900-1000	United Kingdom, BBC London	11760me	11940af	12095af	15070af
		15190sa	15280as	15310as	15400eu
		15575me	17640af	17705af	17790as
		17830as	17885af		
0900-0915	United Kingdom, BBC London	6120as	6195eu	7345eu	9580as
		11955as	15360as		
		5810am	13740am		
0900-1000	USA, KAIJ Dallas TX	7510am			
0900-1000	USA, KTNB Salt Lk City UT	9930as			
0900-1000	USA, KWHR Naalehu HI	7395sa	7535eu	9430as	13615pa
0900-1000	USA, Monitor Radio Intl	9350na			
0900-1000	USA, WEWN Birmingham AL	7315am	9495am	9930am	
0900-1000	USA, WHRI Noblesville IN	11950na			
0900-1000	USA, WINB Red Lion PA	7490na	13595na		
0900-1000	USA, WJCR Upton KY	9465eu			
0900-1000 smtwfh	USA, WMLK Bethel PA	5065am	5935am		
0900-1000	USA, WWCR Nashville TN	5975do	6045do	7285do	
0900-1000	Zimbabwe, ZBC/Radio 4	5895eu	7370eu	9830eu	13830eu
0903-0910 mtwhfa	Croatia, Croatian Radio	7290na	12000na		
0910-0940	Mongolia, R Ulan Bator	6130do	7295do		
0915-1000	Ghana, Ghana Broadc Corp	15650au	17525au		
0920-0935 sh	Greece, Voice of	15275eu	15370eu		
0930-0945 s	Armenia, Radio Yerevan	17870pa			
0930-1000 mtwhfa	Austria, R Austria Intl	6160do			
0930-1000	Canada, CKZN St John's	7260pa	9720pa	9810pa	21505pa
0930-1000	Netherlands, Radio				

0930-1000	Philippines, FEBC/R Intl	11690as			
0930-1000	Russia, Voice of	11675as	12015as		
0940-0950	Greece, Voice of	15650au	17525au		
1000 UTC					
1000-1100	Australia, AF Radio	13525as			
1000-1100	Australia, Radio	9580pa	9860pa	15170as	21725as
1000-1100 vl	Australia, VL8A Alice Spg	2310do			
1000-1100 vl	Australia, VL8K Katherine	2485do			
1000-1100 vl	Australia, VL8T Tent Crk	2325do			
1000-1100	Bahrain, Radio	6010do			
1000-1100	Canada, CFCX Montreal	6005do			
1000-1100	Canada, CFRX Toronto	6070do			
1000-1100	Canada, CFVP Calgary	6030do			
1000-1100	Canada, CHNX Halifax	6130do			
1000-1100	Canada, CKZN St John's	6160do			
1000-1100	Canada, CKZU Vancouver	6160do			
1000-1100	China, China Radio Intl	6590as	11755pa	15440pa	
1000-1100	Costa Rica, R Peace Intl	9400am			
1000-1100	Ecuador, HCJB Quito	6135as	9745pa	11925pa	21455pa
1000-1100 as	Eqt Guinea, R East Africa	9585af			
1000-1040	Ghana, Ghana Broadc Corp	6130do	7295do		
1000-1100	India, All India Radio	15050as	15180as	17387au	17895as
1000-1100	Iraq, Radio Iraq Intl	13680eu			
1000-1100 mtwh/vl	Italy, IRRS Milan	7125va			
1000-1100	Malaysia, Radio	7295do			
1000-1100	Malaysia, RTM/Kota Kinab	5980do			
1000-1030	Netherlands, Radio	7260pa	9720pa	9810pa	21505pa
1000-1100	New Zealand, R NZ Intl	6100pa			
1000-1100	Nigeria, FRCN/Radio	4990do	7285do		
1000-1100	Nigeria, FRCN/Voice of	7255af			
1000-1100 mtwhfa	Palau, KHBV/Voice of Hope	9830as			
1000-1100 vl	Papua New Guinea, NBC	4890do	9675do		
1000-1100	Philippines, FEBC/R Intl	11690as			
1000-1100	Russia, Voice of	9480eu	9550eu	9680na	11675na
		12015eu	15385na	17860as	
1000-1100	S Africa, Channel Africa	17810af			
1000-1100 vl	Slovakia, AWR	9450eu			
1000-1030	Switzerland, Swiss R Intl	6165eu	9535eu	9885as	11640as
		13635as			
		4976do			
1000-1015	Uganda, Radio	6165eu	6190af	6195as	9410eu
1000-1100	United Kingdom, BBC London	9740na	11760me	11940af	12095af
		15070af	15190sa	15310as	15400eu
		15575me	17640af	17705eu	17790as
		17830af	17885af		
1000-1030	United Kingdom, BBC London	15280as			
1000-1100	USA, KAIJ Dallas TX	9815am	13815am		
1000-1100	USA, KTNB Salt Lk City UT	7510am			
1000-1100	USA, KWHR Naalehu HI	9930as			
1000-1100	USA, Monitor Radio Intl	6095ca	7395sa	9430as	13625as
1000-1100	USA, VOA Washington DC	5985pa	7405am	9590am	11720pa
		11915am	15120am	15425pa	
1000-1100	USA, WEWN Birmingham AL	9350na			
1000-1100	USA, WHRI Noblesville IN	6040am	9850am	9930am	
1000-1100	USA, WINB Red Lion PA	11950na			
1000-1100	USA, WJCR Upton KY	7490na	13595na		
1000-1100	USA, WWCR Nashville TN	5065am	5935am		
1000-1100	USA, WYFR Okeechobee FL	5950na			
1000-1030	Vietnam, Voice of	10059as	12025as	15010as	
1003-1010 s	Croatia, Croatian Radio	5895eu	7370eu	9830eu	13830eu
1020-1030 mtwffa	Vatican State, Vatican R	11740af	15210af	17585me	
1030-1100	Austria, R Austria Intl	17870pa			
1030-1100	Czech Rep, Radio Prague	7345eu	9505eu		
1030-1100	Malaysia, RTM/Kuching	7160do			
1030-1100	Netherlands, Radio	7260pa	9810pa		
1030-1100	Sri Lanka, SLBC Colombo	11835as	15120as	17850au	
1030-1100	UAE, Radio Dubai	13675eu	15320eu	15395eu	21605me



## FREQUENCIES

1100-1200	Australia, AF Radio	13525as				1100-1115	Rwanda, Radio	13370as	17765na	17860me
1100-1200	Australia, Radio	9510pa	9580pa	9710pa	9860pa	1100-1200	Singapore, SBC Radio One	6055do		
		13605as	15170as	15565as		1100-1200	Singapore, R Singapore Int	6155do		
1100-1200 vl	Australia, VL8A Alice Spg	2310do				1100-1130	Sri Lanka, SLBC Colombo	9530as	15120as	17850au
1100-1200 vl	Australia, VL8K Katherine	2485do				1100-1130	Switzerland, Swiss R Intl	11835as	6165eu	
1100-1200 vl	Australia, VL8T Tent Crk	2325do				1100-1200	Taiwan, Voice of Asia	7445as	9535eu	
1100-1200	Bahrain, Radio	6010do				1100-1102	Uganda, Radio	7110do	7195do	
1100-1200	Canada, CFCX Montreal	6005do				1100-1200	United Kingdom, BBC London	5965na	6165eu	6190af
1100-1200	Canada, CFRX Toronto	6070do						9410eu	9670na	6195na
1100-1200	Canada, CFVP Calgary	6030do						11940af	12095af	9740na
1100-1200	Canada, CHNX Halifax	6130do						15575me	17640af	15070af
1100-1200	Canada, CKZN St John's	6160do						21660af	17830sa	17885af
1100-1200	Canada, CKZU Vancouver	6160do				1100-1130	United Kingdom, BBC London	5965na	9700as	15400eu
1100-1200 mtwhf	Costa Rica, AWR Alajuela	5030ca	9725am			1100-1200	USA, KAIJ Dallas TX	9815am	13815am	
1100-1200	Costa Rica, R Peace Intl	9400am				1100-1200	USA, KTBN Salt Lk City UT	7510am		
1100-1130	Ecuador, HCJB Quito	9745pa	11925pa	21455pa		1100-1200	USA, KWHR Naalehu HI	9930as		
1100-1200	Ecuador, HCJB Quito	12005am	15115am	21455pa		1100-1200	USA, Monitor Radio Intl	6095na	7395ca	9355eu
1100-1200 as	Eqt Africa, R East Africa	9585af				1100-1200	USA, VOA Washington DC	5985as	6110as	9425au
1100-1130	Georgia, Radio	11815eu						9590am	9615as	7405am
1100-1150	Germany, Deutsche Welle	15370af	15410af	17765af	17800af			11915am	9760as	11720as
		21600af							15120am	15160as
1100-1110 as	Ghana, Ghana Broadc Corp	3366do	4915do			1100-1200	USA, WEWN Birmingham AL	6000na		15425as
1100-1200	Iraq, Radio Iraq Intl	13680eu				1100-1200	USA, WHRI Noblesville IN	6040am	9850am	9930am
1100-1130	Israel, Kol Israel	15640na	15650eu	17575eu		1100-1200	USA, WJCR Upton KY	7490na	13595na	
1100-1200 mtwhf/vl	Italy, IRRS Milan	7125va				1100-1200	USA, WYFR Okeechobee FL	5950na	7355na	
1100-1200	Japan, NHK/Radio	6120na	9610as	15295as		1130-1200	Austria, R Austria Intl	13730na		
1100-1200	Malaysia, Radio	7295do				1130-1200	Bulgaria, Radio	9770as	11740as	
1100-1200	Malaysia, RTM/Kota Kinab	5980do				1130-1200 vl	China, China Radio Intl	8660as	11445as	15135as
1100-1200	Malaysia, RTM/Kuching	7160do				1130-1200	Iran, VOIRI Tehran	11745as	11790as	11930me
1100-1200	New Zealand, R NZ Intl	6100pa				1130-1155 s	Monaco, Trans World Radio	7115eu		
1100-1105	Nigeria, FRCN/Radio	4990do	7285do			1130-1200 a	Monaco, Trans World Radio	7115eu		
1100-1150	North Korea, R Pyongyang	6576na	9977na	11335na		1130-1200	Netherlands, Radio	6045eu	7130eu	7160eu
1100-1130 s	Norway, Radio Norway Intl	9590eu	11850eu			1130-1200	Russia, Voice of	11655na		
1100-1120	Pakistan, Radio	15625as	17900as			1130-1200	South Korea, R Korea Intl	9650na		
1100-1200 mtwhf	Palau, KHBV/Voice of Hope	9830as				1130-1200	Sweden, Radio	13775au	15120as	15240as
1100-1200 vl	Papua New Guinea, NBC	4890do	9675do			1130-1200	Vietnam, Voice of	10059as	12025as	15010as
1100-1200	Russia, Voice of	7205as	9470eu	9550eu	9680eu	1145-1200	Rwanda, Radio	6055do		
		11675eu	11835as	11980as	12015eu	1145-1200 s	USA, WRMI/R Miami Intl	9955am		

## SELECTED PROGRAMS

## Sundays

- 1130 BBC (af): Variable Drama. A different 60-minute radio play each week.  
 1130 BBC (am): In Praise of God. See S 0230.  
 1130 BBC (as pac): Variable Drama. See S 1130.  
 1130 BBC (eu): Jazz for the Asking. See S 0630.  
 1130 BBC (south as): The John Dunn Show. See S 0330.

## Mondays

- 1130 BBC (af): Omnibus. Each week a half-hour programme on practically any topic under the sun.  
 1130 BBC (am): Variable Comedy/Quiz Feature. See S 1530.  
 1130 BBC (as pac): Variable Comedy/Quiz Feature. See S 1530.  
 1130 BBC (eu): Omnibus. See M 1130.  
 1130 BBC (south as): Composer of the Month. See M 0130.

## Tuesdays

- 1130 BBC (af): Thirty-Minute Drama. Variable drama programs.  
 1130 BBC (am): Variable Comedy/Quiz Feature. See S 1530.  
 1130 BBC (as pac): Thirty-Minute Drama. See T 1130.  
 1130 BBC (eu): Thirty-Minute Drama. See T 1130.  
 1130 BBC (south as): Variable Feature. See S 0115.

## Wednesdays

- 1100 BBC (south as): Omnibus. See M 1130.  
 1130 BBC (af): Meridian. See S 0630.  
 1130 BBC (am): Folk Routes. See T 0030.  
 1130 BBC (as pac): Meridian. See S 0630.  
 1130 BBC (eu): Meridian. See S 0630.  
 1130 BBC (south as): Meridian Documentaries. One of three topical programmes weekly about the world of the arts.  
 1145 BBC (am): Variable Feature. See S 0115.

## Thursdays

- 1130 BBC (af): Variable Music Feature. See S 0015.  
 1130 BBC (am): Variable Music Feature. See S 0015.  
 1130 BBC (as pac): Variable Feature. See S 0115.  
 1130 BBC (eu): Variable Music Feature. See S 0015.  
 1130 BBC (south as): Variable Feature. See S 0115.  
 1145 BBC (am): The Learning World. See S 0030.

## Fridays

- 1130 BBC (af): Meridian. See S 0630.  
 1130 BBC (am): Focus on Faith. See F 0130.

- 1130 BBC (as pac): Meridian. See S 0630.  
 1130 BBC (eu): Meridian. See S 0630.  
 1130 BBC (south as): Meridian. See S 0630.

## Saturdays

- 1130 BBC (af): Meridian. See S 0630.

HAUSER'S HIGHLIGHTS  
CANADA: RCI

Some RCI programming as planned for summer if they can still afford it, often a few minutes later than shown after news:

<i>Quirks and Quarks</i>	Sat 2300 on 5960, 9755, 11940, 13670, 15305
<i>Earth Watch</i>	Sat 2030 on 11985, 13650, 13670, 15150, 15325, 17820
	Sat 2230 on 5960, 9755, 13670
	Sun 0130 on 6120, 9535, 9755, 11940, 13670
<i>Innovation Canada</i>	Sat 2000 as 2030 above
	Sun 0100 as 0130 above
<i>Arts in Canada</i>	Sun 2000 as Sat 2000 above
	Mon 0100 as Sun 0100 above
<i>RCI Mailbag</i>	Sun 2030 as Sat 2030 above
	Sun 2230 as Sat 2230 above
	Mon 0130 as Sun 0130 above
<i>Double Exposure</i>	Sun 0200 as Sun 0130 above
	Mon 1200 on 9635, 11855, 13650
<i>Royal Canadian Air Force</i>	Sat 2100 on 11690, 13650, 13670, 15150, 15325, 17820
	Sun 0230 as Sun 0130 above
	Mon 1235 as Mon 1200 above
<i>Now the Details</i>	Mon 0230 as Sun 0130 above
<i>Tapestry</i>	Sun 2300 as Sat 2300 above
<i>As It Happens</i>	Mon-Fri 2230-2400 on 5960, 9755, 13670
	Tue-Fri 1200 as Mon 1200 above
<i>Sunday Morning</i>	Sun 1311-1600 on 11955, 17820 (via Bill Westenhaver, PQ)

## FREQUENCIES

1200-1230	Australia, Radio	5995pa 11800pa	6060pa 15565as	6080pa	9610as			11675af 12065me	11760eu 13370eu	11980eu 15190af	12015af 15485eu
1200-1300 vl	Australia, VL8A Alice Spg	2310do				1200-1300	Singapore, SBC Radio One	6155do			
1200-1300 vl	Australia, VL8K Katherine	2485do				1200-1300	Singapore, R Singapore Int	9530as			
1200-1300 vl	Australia, VL8T Tent Crk	2325do				1200-1300	South Korea, R Korea Intl	7800as			
1200-1300	Bahrain, Radio	6010do				1200-1300	Taiwan, VO Free China	7130au	9610as		
1200-1300	Brazil, Radiobras	15445na				1200-1300	United Kingdom, BBC London	5965na	6190af	6195na	9410eu
1200-1230	Bulgaria, Radio	9770as	11740as				9515na 9740na	11750as	11760as	11940af	12095af
1200-1215	Cambodia, Natl Voice of	11940as					15070af 15220na	15310as	15575me	17640af	17705eu
1200-1300 vl	Canada, CBC N Quebec Svc	9625do					17830af 17885af	21660af			
1200-1300	Canada, CFCX Montreal	6005do				1200-1300	USA, KALJ Dallas TX	5810am	9815am		
1200-1300	Canada, CFRX Toronto	6070do				1200-1300	USA, KTNB Salt Lk City UT	7510am			
1200-1300	Canada, CFVP Calgary	6030do				1200-1300	USA, KWHR Naalehu HI	9930as			
1200-1300	Canada, CHNX Halifax	6130do				1200-1300	USA, Monitor Radio Intl	6095na	9425au	9455na	13625as
1200-1300	Canada, CKZN St John's	6160do				1200-1300	USA, VOA Washington DC	6110as	9645as	9760as	11715as
1200-1300	Canada, CKZU Vancouver	6160do						15160as	15425as		
1200-1230 vl	China, China Radio Intl	8660as	11445as	15135as		1200-1300	USA, WEWN Birmingham AL	6000na			
1200-1300	China, China Radio Intl	8425as	9715as	11660as	11795pa	1200-1300	USA, WHRI Noblesville IN	6040am	9850am	9930am	
		15440pa				1200-1300	USA, WJCR Upton KY	7490na	13595na		
1200-1300 mtwhf	Costa Rica, AWR Alajuela	5030am	9725am			1200-1300 s	USA, WRMI/R Miami Intl	9955am			
1200-1300	Costa Rica, R Peace Intl	6200am	9400am	15050am		1200-1300	USA, WVHA Green Bush ME	11745eu			
1200-1300	Ecuador, HCJB Quito	12005am	15115am	21455pa		1200-1300	USA, WWCR Nashville TN	5065am	5935am	15685am	
1200-1300 as	Eqt Africa, R East Africa	9585af				1200-1300	USA, WYFR Okeechobee FL	5950na	7355na	11830na	11970na
1200-1300	France, Radio France Intl	11615na	13625na	15325af	15365na	1200-1300	Uzbekistan, R Tashkent	6025eu	9715eu	13785eu	
1200-1300 vl	Guatemala, AWR	5980ca				1206-1300 occsnal	New Zealand, R NZ Intl	6100pa			
1200-1230	Iran, VOIRI Tehran	11745as	11790as	11930me		1220-1229 vl	Ghana, Ghana Broadc Corp	4915do			
1200-1300	Iraq, Radio Iraq Intl	13680eu				1230-1300	Australia, Radio	5995pa	6060pa	7260as	11800pa
1200-1300 mtwhf/vl	Italy, IRRS Milan	7125va						15565as			
1200-1300	Jordan, Radio	9560eu				1230-1300	Austria, R Austria Intl	15450as			
1200-1300 vl	Liberia, Radio ELBC	7275do				1230-1300	Bangladesh, Radio	9650as	13615as	15520as	
1200-1300	Malaysia, Radio	7295do				1230-1300 s	Belgium, R Vlaanderen Int	13675na			
1200-1300	Malaysia, RTM/Kota Kinab	5980do				1230-1300	Canada, RCI Montreal	6150as	11730as		
1200-1235	Moldova, R Moldova Intl	15315na				1230-1300	Finland, YLE/Radio	11735na	11740na	15400na	
1200-1230 mw	Mongolia, R Ulan Bator	7290na	12015na			1230-1300	France, Radio France Intl	9850eu	15155eu	15195eu	
1200-1230 ha	Mongolia, R Ulan Bator	7290na	12000na			1230-1300	Ghana, Ghana Broadc Corp	6130do	7295do		
1200-1300	Netherlands, Radio	6045eu	7130eu	7160eu		1230-1300	Indonesia, RRI Sorong	4875do			
1200-1206	New Zealand, R NZ Intl	6100pa				1230-1300	Russia, Voice of	6000eu	6060eu	11655as	
1200-1230	Nigeria, FRCN/Radio	4990do	7285do			1230-1300	South Korea, R Korea Intl	9570as	11740as	13670eu	
1200-1300 mtwhf	Palau, KHBN/Voice of Hope	9830as				1230-1300	Sweden, Radio	11650na	15240na		
1200-1230 a	Palau, KHBN/Voice of Hope	9830as				1230-1300	Turkey, Voice of	9675as			
1200-1300 vl	Papua New Guinea, NBC	4890do	9675do			1230-1300	Vietnam, Voice of	10059as	12025as	15010as	
1200-1255	Poland, Polish R Warsaw	6135eu	7145eu	7270eu	9525eu	1230-1300	Yugoslavia, Radio	11835au	11865au		
		11815eu				1240-1250	Greece, Voice of	9935af	11645af	15650af	
1200-1300	Russia, Voice of	7205na	9470eu	9540eu	9680eu						

## SELECTED PROGRAMS

## Sundays

- 1205 BBC (am): World Business Brief. See S 1205.  
 1205 BBC (eu): World Business Brief. Focus on the market week.  
 1205 BBC (south as): World Business Brief. See S 1205.  
 1215 BBC (am): On Screen. Film reviews and movie news from around the world.  
 1215 BBC (eu): Britain Today. See S 0045.  
 1215 BBC (south as): A Jolly Good Show. See S 0415.  
 1230 BBC (af): On Screen. See S 1215.  
 1230 BBC (am): On the Move. See S 0615.  
 1230 BBC (as pac): Andy Kershaw's World of Music. Recordings of diverse music from around the world.  
 1230 BBC (eu): The John Dunn Show. See S 0330.  
 1245 BBC (af): Sports Roundup. See S 0315.  
 1245 BBC (am): Sports Roundup. See S 0315.

## Mondays

- 1205 BBC (af): World Business Report. Latest news from the markets in the Far East, Europe and the USA.  
 1205 BBC (am): World Business Report. See M 1205.  
 1205 BBC (as pac): World Business Report. See M 1205.  
 1205 BBC (eu): World Business Report. See M 1205.  
 1205 BBC (south as): World Business Report. See M 1205.  
 1215 BBC (af): Britain Today. See S 0045.  
 1215 BBC (am): Anything Goes. See S 0530.  
 1215 BBC (as pac): John Peel. See S 0530.  
 1215 BBC (eu): Britain Today. See S 0045.  
 1215 BBC (south as): Britain Today. See S 0045.  
 1230 BBC (af): Development '95. Aid and development issues.  
 1230 BBC (eu): Variable Music Feature. See S 0015.  
 1230 BBC (south as): Andy Kershaw's World of Music. See S 1230  
 1245 BBC (af): Sports Roundup. See S 0315.  
 1245 BBC (am): Sports Roundup. See S 0315.  
 1245 BBC (as pac): Letter from America. See S 0030.

## Tuesdays

- 1205 BBC (af): World Business Report. See M 1205.  
 1205 BBC (am): World Business Report. See M 1205.  
 1205 BBC (as pac): World Business Report. See M 1205.  
 1205 BBC (eu): World Business Report. See M 1205.  
 1205 BBC (south as): World Business Report. See M 1205.  
 1215 BBC (af): Britain Today. See S 0045.

- 1215 BBC (am): John Peel. See S 0530.  
 1215 BBC (as pac): Multitrack: Hit List. See M 1615.  
 1215 BBC (eu): Britain Today. See S 0045.  
 1215 BBC (south as): Britain Today. See S 0045.  
 1230 BBC (af): Folk Routes. See T 0030.  
 1230 BBC (eu): Variable Feature. See S 0115.  
 1230 BBC (south as): Multitrack: Hit List. See M 1615.  
 1245 BBC (af): Sports Roundup. See S 0315.  
 1245 BBC (am): Sports Roundup. See S 0315.  
 1245 BBC (as pac): Sports Roundup. See S 0315.

## Wednesdays

- 1205 BBC (af): World Business Report. See M 1205.  
 1205 BBC (am): World Business Report. See M 1205.  
 1205 BBC (as pac): World Business Report. See M 1205.  
 1205 BBC (eu): World Business Report. See M 1205.  
 1205 BBC (south as): World Business Report. See M 1205.  
 1215 BBC (af): Britain Today. See S 0045.  
 1215 BBC (am): The Vintage Chart Show. Each week a classic Top 20 from the past with Paul Burnett.  
 1215 BBC (as pac): Megamix. See T 1615.  
 1215 BBC (eu): Britain Today. See S 0045.  
 1215 BBC (south as): Britain Today. See S 0045.  
 1230 BBC (af): Variable Feature. See S 0115.  
 1230 BBC (eu): Composer of the Month. See M 0130.  
 1230 BBC (south as): Megamix. See T 1615.  
 1245 BBC (af): Sports Roundup. See S 0315.  
 1245 BBC (am): Sports Roundup. See S 0315.  
 1245 BBC (as pac): Sports Roundup. See S 0315.

## Thursdays

- 1205 BBC (af): World Business Report. See M 1205.  
 1205 BBC (am): World Business Report. See M 1205.  
 1205 BBC (as pac): World Business Report. See M 1205.  
 1205 BBC (eu): World Business Report. See M 1205.  
 1205 BBC (south as): World Business Report. See M 1205.  
 1215 BBC (af): Britain Today. See S 0045.  
 1215 BBC (am): Variable Music Feature. See S 0015.  
 1215 BBC (as pac): Multitrack: X-Press. See W 1615.  
 1215 BBC (eu): Britain Today. See S 0045.  
 1215 BBC (south as): Britain Today. See S 0045.  
 1230 BBC (af): From Our Own Correspondent. See S 0130.

- 1230 BBC (eu): Assignment. See H 0130.  
 1230 BBC (south as): Multitrack: X-Press. See W 1615.  
 1245 BBC (af): Sports Roundup. See S 0315.  
 1245 BBC (am): Sports Roundup. See S 0315.  
 1245 BBC (as pac): Sports Roundup. See S 0315.

## Fridays

- 1205 BBC (af): World Business Report. See M 1205.  
 1205 BBC (am): World Business Report. See M 1205.  
 1205 BBC (as pac): World Business Report. See M 1205.  
 1205 BBC (eu): World Business Report. See M 1205.  
 1205 BBC (south as): World Business Report. See M 1205.  
 1215 BBC (af): Britain Today. See S 0045.  
 1215 BBC (am): New Ideas. See S 1530.  
 1215 BBC (as pac): Variable Music Feature. See S 0015.  
 1215 BBC (eu): Britain Today. See S 0045.  
 1215 BBC (south as): Britain Today. See S 0045.  
 1230 BBC (af): The Farming World. See M 0015.  
 1230 BBC (am): Waveguide. See S 0350.  
 1230 BBC (eu): Science in Action. See S 0430.  
 1230 BBC (south as): Variable Music Feature. See S 0015.  
 1245 BBC (af): Sports Roundup. See S 0315.  
 1245 BBC (am): Sports Roundup. See S 0315.  
 1245 BBC (as pac): Sports Roundup. See S 0315.

## Saturdays

- 1205 BBC (af): World Business Report. See M 1205.  
 1205 BBC (am): World Business Review. See S 0305.  
 1205 BBC (as pac): World Business Review. See S 0305.  
 1205 BBC (eu): World Business Review. See S 0305.  
 1205 BBC (south as): World Business Review. See S 0305.  
 1215 BBC (af): Britain Today. See S 0045.  
 1215 BBC (am): A Jolly Good Show. See S 0415.  
 1215 BBC (as pac): Multitrack: Alternative. See F 1430.  
 1215 BBC (eu): Britain Today. See S 0045.  
 1215 BBC (south as): Britain Today. See S 0045.  
 1230 BBC (af): From the Weeklies. See A 0030.  
 1230 BBC (eu): Variable Comedy/Quiz Feature. See S 1530.  
 1230 BBC (south as): Multitrack: Alternative. See F 1430.  
 1245 BBC (af): Variable Feature. See S 0115.  
 1245 BBC (as pac): Letter from America. See S 0030.

## FREQUENCIES

1300-1400	Australia, Radio	5995pa	7240as	9610as	11800pa	1300-1330	Switzerland, Swiss R Intl	7250as	7480as	11640as	13635as
1300-1330	Australia, Radio	6060pa	6080as			1300-1400	United Kingdom, BBC London	5990as	6190af	6195na	7110as
1300-1400 vl	Australia, VL8A Alice Spg	2310do						7180na	9410eu	9515na	9740na
1300-1400 vl	Australia, VL8K Katherine	2485do						11750as	11760me	11940af	12095af
1300-1400 vl	Australia, VL8T Tent Crk	2325do						15070af	15220na	15310as	15420af
1300-1400	Bahrain, Radio	6010do						15575me	17640af	17705eu	17830af
1300-1330 mtwhfa	Belgium, R Vlaanderen Int	13675na					17885af	21660af			
1300-1320	Brazil, Radiobras	15445na				1300-1330	United Kingdom, BBC London	15105af			
1300-1400 vl	Canada, CBC N Quebec Svc	9625do				1300-1400	USA, KAIJ Dallas TX	5810am	9815am		
1300-1400	Canada, CFCX Montreal	6005do				1300-1400	USA, KJES Mesquite NM	11715na			
1300-1400	Canada, CFRX Toronto	6070do				1300-1400	USA, KNLS Anchor Point AK	7365as			
1300-1400	Canada, CFPV Calgary	6030do				1300-1400	USA, KTBN Salt Lk City UT	7510am			
1300-1400	Canada, CHNX Halifax	6130do				1300-1400	USA, Monitor Radio Intl	6095na	9455na	13625as	
1300-1400	Canada, CKZN St John's	6160do				1300-1400	USA, VOA Washington DC	6110as	9645as	9760as	11805as
1300-1400	Canada, CKZV Vancouver	6160do						15160as	15425as		
1300-1400 mtwhf	Canada, RCI Montreal	6150na	11855na	17820na		1300-1400	USA, WEWN Birmingham AL	6000na	7425na	12160na	
1300-1400	China, China Radio Intl	8425as	9715as	15440pa		1300-1400	USA, WHRI Noblesville IN	6040am	9930am	15105am	
1300-1400	Costa Rica, R Peace Intl	6200am	9400am	15050am		1300-1400	USA, WJCR Upton KY	7490na	13595na		
1300-1400	Ecuador, HCJB Quito	12005am	15115am	17890am	21455eu	1300-1400 s	USA, WRMI/R Miami Intl	9955am			
1300-1400 as	Egt Africa, R East Africa	9585af				1300-1400	USA, WVHA Green Bush ME	11745eu			
1300-1330	Ghana, Ghana Broadc Corp	3366do	4915do			1300-1400	USA, WWCN Nashville TN	5065am	5935am	15685am	
1300-1400 vl	Guatemala, AWR	5980ca				1300-1400	USA, WYFR Okeechobee FL	5950na	9705na	11550na	11830na
1300-1400 mtwh/vl	Italy, IRRS Milan	7125va						11970na	13695af		
1300-1400 mtwhfa	Lebanon, Wings of Hope	9960me				1303-1310	Croatia, Croatian Radio	5895eu	7370eu	9830eu	13640eu
1300-1400 vl	Liberia, Radio ELBC	7275do						13830eu			
1300-1400	Malaysia, Radio	7295do				1330-1400	Austria, R Austria Intl	6155eu	13730eu	15450as	
1300-1400	Malaysia, RTM/Kota Kinab	5980do				1330-1400	Canada, RCI Montreal	6150as	9535as		
1300-1400	Malaysia, RTM/Kuching	7160do				1330-1400	Costa Rica, R Peace Intl	9400am			
1300-1325	Netherlands, Radio	6045eu	7130eu	7160eu		1330-1400	Finland, YLE/Radio	11735na	15400na	17740na	
1300-1400 occsnal	New Zealand, R NZ Intl	6100pa				1330-1400 tw	Ghana, Ghana Broadc Corp	4915do			
1300-1350	North Korea, R Pyongyang	9345as	11740as			1330-1400	India, All India Radio	13732as	15120as		
1300-1330 s	Norway, Radio Norway Intl	11730as	13800as	15190as	15605as	1330-1400	Moldova, R Moldova Intl	15315eu			
1300-1400 mtwhf	Palau, KHBN/Voice of Hope	9830as				1330-1400	Netherlands, Radio	9895as	13700as	15150as	
1300-1400 vl	Papua New Guinea, NBC	4890do	9675do			1330-1400	Russia, Voice of	12015as	15190eu		
1300-1400	Philippines, FEBC/R Intl	11995as				1330-1400	Sweden, Radio	11650na	15240na		
1300-1400	Romania, R Romania Intl	9690eu	11940eu	15390eu		1330-1400	Switzerland, Swiss R Intl	6165eu	9535eu		
1300-1400	Russia, Voice of	5925as	7205eu	9540na	9680eu	1330-1400	UAE, Radio Dubai	13675eu	15320eu	15395eu	21605me
		11765as	12065na	13370as	15320eu	1330-1400	Uzbekistan, R Tashkent	6025eu	9715eu	13785eu	
		15460eu	15470me	15480as	15560me	1330-1400	Vietnam, Voice of	10059as	12025as	15010as	
1300-1400	Singapore, SBC Radio One	6155do				1335-1345	Greece, Voice of	15650na	17520na		
1300-1400	Singapore, R Singapore Int	9530as				1345-1400	Vatican State, Vatican R	11625as	12050as	15585pa	

## SELECTED PROGRAMS

## Sundays

- 1305 Swiss Radio Int'l: Newsnet. See A 1305.  
 1311 Radio Canada Int'l: Sunday Morning. A magazine program covering virtually everything under the sun.  
 1340 Radio Canada Int'l: The Mailbag. Listener letters, musical selections, and happenings in Canada.

## Mondays

- 1304 Radio Vlaanderen Int'l: Press Review. Stories on the front pages of the day's papers.  
 1305 Swiss Radio Int'l: Newsnet. See A 1305.  
 1316 Radio Vlaanderen Int'l: Tourism. Take an audio tour of the sights and sounds of Belgium.  
 1330 Radio Sweden: Sixty Degrees North. See F 1330.  
 1341 Radio Canada Int'l: Spectrum. A weekday magazine program of current affairs, features, and a business report.  
 1346 Radio Sweden: Sports Scan. A weekly review of all the news in sports.

## Tuesdays

- 1304 Radio Vlaanderen Int'l: Press Review. See M 1304.  
 1305 Swiss Radio Int'l: Newsnet. See A 1305.  
 1308 Radio Vlaanderen Int'l: Belgium Today. Current affairs in Belgium.  
 1330 Radio Sweden: Sixty Degrees North. See F 1330.  
 1341 Radio Canada Int'l: Spectrum. See M 1341.  
 1349 Radio Sweden: Media Scan (1&3). Satellite news 85%; medium wave and shortwave news 15% or less.

## Wednesdays

- 1305 Swiss Radio Int'l: Newsnet. See A 1305.  
 1306 Radio Vlaanderen Int'l: Press Review. See M 1304.  
 1310 Radio Vlaanderen Int'l: Belgium Today. See T 1308.  
 1316 Radio Vlaanderen Int'l: Living in Belgium. Belgian lifestyles and activities.  
 1330 Radio Sweden: Sixty Degrees North. See F 1330.

- 1341 Radio Canada Int'l: Spectrum. See M 1341.  
 1347 Radio Sweden: Money Matters. Economic and financial trends.

## Thursdays

- 1305 Radio Vlaanderen Int'l: Press Review. See M 1304.  
 1305 Swiss Radio Int'l: Newsnet. See A 1305.  
 1308 Radio Vlaanderen Int'l: Belgium Today. See T 1308.  
 1314 Radio Vlaanderen Int'l: The Arts. Cultural events in the news.  
 1319 Radio Vlaanderen Int'l: Green Society. Environmental issues facing Belgium.  
 1330 Radio Sweden: Sixty Degrees North. See F 1330.  
 1341 Radio Canada Int'l: Spectrum. See M 1341.  
 1346 Radio Sweden: Green Scan. Environmental concerns and solutions.  
 1346 Radio Sweden: Horizon (4). Science and technology in Sweden.

## Fridays

- 1305 Swiss Radio Int'l: Newsnet. See A 1305.  
 1306 Radio Vlaanderen Int'l: Press Review. See M 1304.  
 1310 Radio Vlaanderen Int'l: Belgium Today. See T 1308.  
 1320 Radio Vlaanderen Int'l: Economics. See H 2349.  
 1330 Radio Sweden: Sixty Degrees North. Reports, interviews and analysis from Stockholm and other Nordic capitals.  
 1335 Radio Sweden: A Review of the Newsweek. Looking back at the week's news events.  
 1341 Radio Canada Int'l: Spectrum. See M 1341.

## Saturdays

- 1305 Radio Vlaanderen Int'l: Press Review. See M 1304.  
 1305 Swiss Radio Int'l: Newsnet. See An in-depth look at issues, events and people.  
 1321 Radio Vlaanderen Int'l: Tourism. See M 1316.  
 1330 Radio Sweden: People and Ideas. See S 0030.  
 1340 Radio Canada Int'l: Innovation Canada. See S 0105.

HAUSER'S HIGHLIGHTS  
UNITED ARAB EMIRATES: UAE  
RADIO, ABU DHABI

## Arabic

21630	0800-1000.
21500	0900-1100
21485	1600-1700
17885	0900-1359
17765	1100-1300
17740	1000-1200
15380	0800-0900
15315	0600-1100
	1359-1500
	0400-0500
15265	1359-1500
13605	0600-1000
11970	1359-1900
11885	0600-0800
	0900-1000
	1100-1600
11815	1200-1500
9780	1500-2200
9770	0600-0700
9605	1700-1900
7215	0200-0600,
	1500-1800
6180	0200-0500

(as monitored in late January by BBCM)

## FREQUENCIES

1400-1500	Australia, AF Radio	8743af	10623af			1400-1500	Russia, Voice of	5925as	7205as	7490as	9680eu
1400-1430	Australia, Radio	5995pa	7240pa	9610pa	9710pa			9830na	12015as	12065eu	13370as
		11800pa						15320as	15465eu	15480as	15560as
1400-1500 vl	Australia, VL8A Alice Spg	2310do				1400-1500	Singapore, SBC Radio One	6155do			
1400-1500 vl	Australia, VL8K Katherine	2485do				1400-1500 vl	Slovakia, AWR	9455af			
1400-1500 vl	Australia, VL8T Tent Crk	2325do				1400-1500	South Korea, R Korea Intl	5975as	7275as	11740as	
1400-1500	Bahrain, Radio	6010do				1400-1500	United Kingdom, BBC London	5990as	6190af	6195as	7110as
1400-1500 vl	Canada, CBC N Quebec Svc	9625do						7180as	9410eu	9515na	9660as
1400-1500	Canada, CFCX Montreal	6005do						9740na	11750as	11940af	12095af
1400-1500	Canada, CFRX Toronto	6070do						15070af	15575me	17640af	17705eu
1400-1500	Canada, CFVP Calgary	6030do						17830af	17840na	21470af	21660af
1400-1500	Canada, CHNX Halifax	6130do				1400-1500	USA, KAIJ Dallas TX	13815am	15725am		
1400-1500	Canada, CKZN St John's	6160do				1400-1500	USA, KJES Mesquite NM	11715na			
1400-1500	Canada, CKZU Vancouver	6160do				1400-1500	USA, KTVN Salt Lk City UT	7510am			
1400-1500 s	Canada, RCI Montreal	11955na	17820na			1400-1500	USA, Monitor Radio Intl	9355as			
1400-1500	China, China Radio Intl	4200as	7405na	9535as	9785as	1400-1500	USA, VOA Washington DC	6110as	7215as	9645as	9760as
1400-1500	Costa Rica, R Peace Intl	6200am	9400am	15050am				15160as	15205as	15395as	15425as
1400-1430	Ecuador, HCJB Quito	12005am	15115am	21455eu		1400-1500	USA, WEWN Birmingham AL	7425na			
1400-1500 as	Eqt Africa, R East Africa	9585af				1400-1500	USA, WHRI Noblesville IN	6040am	9930am	15105am	
1400-1500	France, Radio France Intl	5405as	7110as	17560af		1400-1500	USA, WJCR Upton KY	7490na	13595na		
1400-1420	Ghana, Ghana Broadc Corp	3366do	4915do			1400-1500 as	USA, WRMI/R Miami Intl	9955am			
1400-1500 vl	Guatemala, AWR	5980ca				1400-1500	USA, WVHA Green Bush ME	11745eu			
1400-1500	India, All India Radio	13732as	15120as			1400-1500	USA, WWCN Nashville TN	5065am	13845am	15685am	
1400-1500 mtwh/vl	Italy, IRRS Milan	7125va				1400-1500	USA, WYFR Okeechobee FL	9705na	11550na	11830na	17760na
1400-1500	Japan, NHK/Radio	9535na	9750as	11705na	11840as	1400-1500	Zambia, R Christian Voice	6065af			
		11915as				1415-1500 mtwfta	Bhutan, Bhutan BC Service	5025do			
1400-1500 mtwhfa	Lebanon, Wings of Hope	9960me				1430-1500	Australia, Radio	5995pa	6060pa	6080pa	7260as
1400-1500 vl	Liberia, Radio ELBC	7275do						9710pa	9770as	11660as	11695pa
1400-1500	Malaysia, Radio	7295do						11800pa			
1400-1500	Malaysia, RTM/Kota Kinab	5980do				1430-1500	Canada, RCI Montreal	9555me	11915eu	11935me	15315eu
1400-1500	Malaysia, RTM/Kuching	7160do						15325me	17820af		
1400-1500	Malta, V of Mediterranean	11925eu				1430-1500	China, China Radio Intl	11445as	15135as		
1400-1500 s	Morocco, RTV Marocaine	17575af				1430-1500	Ecuador, HCJB Quito	15115am	17890am	21455eu	
1400-1500	Netherlands, Radio	9895as	13700as	15150as		1430-1500	Finland, YLE/Radio	11735na	15400na	17740na	
1400-1500 occsna	New Zealand, R NZ Intl	6100pa				1430-1500 s	Ghana, Ghana Broadc Corp	3366do			
1400-1405	Nigeria, FRCN/Radio	4990do	7285do			1430-1500	Myanmar, Radio	5990do	7185do		
1400-1430 s	Norway, Radio Norway Intl	13800na	17795na			1430-1500	Romania, R Romania Intl	11740as	11810as	15335as	
1400-1430 mtwhf	Palau, KHBN/Voice of Hope	9830as				1445-1500	Mongolia, R Ulan Bator	7290na	12000na		
1400-1500	Philippines, FEBC/R Intl	11995as									

## SELECTED PROGRAMS

## Sundays

- 1401 BBC (af): Variable Feature. See S 0115.  
 1401 BBC (eu): Variable Drama. See S 1130.  
 1401 BBC (south as): Variable Feature. See S 0115.  
 1405 BBC (am): Variable Feature. See S 0115.  
 1405 BBC (as pac): Write On. See S 0145.  
 1415 BBC (am): Music Review. News and views from the world of music.  
 1415 BBC (as pac): Concert Hall. Classical music concerts.  
 1430 BBC (south as): Anything Goes. See S 0530.  
 1445 BBC (af): Country Style. With David Allan.

## Mondays

- 1405 BBC (af): Outlook. An up-to-the-minute mix of conversation, controversy and color from around the world.  
 1405 BBC (am): Outlook. See M 1405.  
 1405 BBC (as pac): Outlook. See M 1405.  
 1405 BBC (eu): Outlook. See M 1405.  
 1405 BBC (south as): Outlook. See M 1405.  
 1430 BBC (af): John Peel. See S 0530.  
 1430 BBC (am): Omnibus. See M 1130.  
 1430 BBC (as pac): Health Matters. See M 0445.  
 1430 BBC (eu): John Peel. See S 0530.

## Propagation Forecasting

Jacques d'Avignon  
 965 Lincoln Drive  
 Kingston On K7M 4Z3 Canada

Distributor for ASAPS, propagation software Compuserve 70531,140

- 1430 BBC (south as): Variable Feature. See S 0115.  
 1445 BBC (south as): Development '95. See M 1230.

## Tuesdays

- 1405 BBC (af): Outlook. See M 1405.  
 1405 BBC (am): Outlook. See M 1405.  
 1405 BBC (as pac): Outlook. See M 1405.  
 1405 BBC (eu): Outlook. See M 1405.  
 1405 BBC (south as): Sports Roundup. See S 0315.  
 1415 BBC (south as): Concert Hall. See S 1415.  
 1430 BBC (af): Multitrack: Hit List. See M 1615.  
 1430 BBC (am): Health Matters. See M 0445.  
 1430 BBC (as pac): Discovery. See T 0230.  
 1430 BBC (eu): Multitrack: Hit List. See M 1615.  
 1445 BBC (am): Variable Music Feature. See S 0015.

## Wednesdays

- 1405 BBC (af): Outlook. See M 1405.  
 1405 BBC (am): Outlook. See M 1405.  
 1405 BBC (as pac): Outlook. See M 1405.  
 1405 BBC (eu): Outlook. See M 1405.  
 1405 BBC (south as): Outlook. See M 1405.  
 1430 BBC (af): Megamix. See T 1615.  
 1430 BBC (am): Country Style. See S 1445.  
 1430 BBC (as pac): Omnibus. See M 1130.  
 1430 BBC (eu): Megamix. See T 1615.  
 1430 BBC (south as): Variable Feature. See S 0115.  
 1445 BBC (am): Good Books. See M 0030.  
 1445 BBC (south as): Good Books. See M 0030.

## Thursdays

- 1405 BBC (af): Outlook. See M 1405.  
 1405 BBC (am): Outlook. See M 1405.  
 1405 BBC (as pac): Outlook. See M 1405.  
 1405 BBC (eu): Outlook. See M 1405.  
 1405 BBC (south as): Outlook. See M 1405.  
 1430 BBC (af): Multitrack: X-Press. See W 1615.  
 1430 BBC (am): Network UK. Issues and events affecting the lives of people throughout the UK.  
 1430 BBC (as pac): Assignment. See H 0130.

- 1430 BBC (eu): Multitrack: X-Press. See W 1615.  
 1430 BBC (south as): Sports International. See H 0230.

## Fridays

- 1405 BBC (af): Outlook. See M 1405.  
 1405 BBC (am): Outlook. See M 1405.  
 1405 BBC (as pac): Outlook. See M 1405.  
 1405 BBC (eu): Outlook. See M 1405.  
 1405 BBC (south as): Outlook. See M 1405.  
 1430 BBC (af): Multitrack: Alternative. Latest developments on the British music scene.  
 1430 BBC (am): Variable Feature. See S 0115.  
 1430 BBC (as pac): Variable Feature. See S 0115.  
 1430 BBC (eu): Multitrack: Alternative. See F 1430.  
 1430 BBC (south as): Variable Music Feature. See S 0015.  
 1445 BBC (am): The Farming World. See M 0015.  
 1445 BBC (south as): Global Concerns. See M 0145.

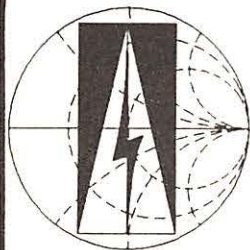
## Saturdays

- 1405 BBC (af): Sportsworld. See S 1505.  
 1405 BBC (am): Sportsworld. See S 1505.  
 1405 BBC (as pac): Sportsworld. See S 1505.  
 1405 BBC (eu): Variable Feature. See S 0115.  
 1405 BBC (south as): Sportsworld. See S 1505.  
 1450 BBC (eu): Write On. See S 0145.

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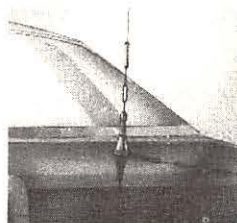
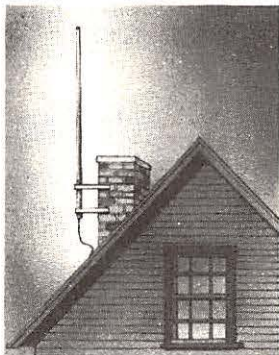
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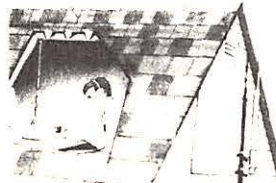
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## FREQUENCIES

1500-1600	Australia, AF Radio	8743af	10623af		1500-1600	Philippines, FEBC/R Intl	11995as		
1500-1600	Australia, Radio	5995pa	6060pa	6080pa	1500-1530	Romania, R Romania Intl	11740as	11810as	15335as
		9710pa	9770as	11660as	1500-1600	Russia, Voice of	4940as	6035eu	7115na
		11800pa		11695pa			7490as	9600eu	9820eu
							12065me	15465eu	12015eu
1500-1600 vl	Australia, VL8A Alice Spg	2310do			1500-1600	S Africa, Channel Africa	7225af		
1500-1600 vl	Australia, VL8K Katherine	2485do			1500-1600 mtwhfa	Seychelles, FEBA Radio	9810as	11870as	
1500-1600 vl	Australia, VL8T Tent Crk	2325do			1500-1600	Singapore, SBC Radio One	6155do		
1500-1600	Bahrain, Radio	6010do			1500-1600 vl	Slovakia, AWR	9455af		
1500-1600 vl	Canada, CBC N Quebec Svc	9625do			1500-1600	Sn Lanka, SLBC Colombo	9720as	15425as	
1500-1600	Canada, CFCX Montreal	6005do			1500-1600	Switzerland, Swiss R Intl	9885as	12075as	13635as
1500-1600	Canada, CFRX Toronto	6070do			1500-1600	United Kingdom, BBC London	5990as	6190af	6195eu
1500-1600	Canada, CFVP Calgary	6030do					9515na	9660as	9740na
1500-1600	Canada, CHNX Halifax	6130do					11750as	11940af	12095me
1500-1600	Canada, CKZN St John's	6160do					15260na	15400eu	17830af
1500-1600	Canada, CKZU Vancouver	6160do					21470af	21660af	17840na
1500-1600 s	Canada, RCI Montreal	11955na	17820na				15420af	17790af	21490af
1500-1600	China, China Radio Intl	4200as	7405na	9335as	1500-1530	United Kingdom, BBC London	13815am	15725am	
1500-1600	Costa Rica, R Peace Intl	6200am	9400am	15050am	1500-1600	USA, KAIJ Dallas TX	7510am		
1500-1600	Ecuador, HCJB Quito	6080do	15115am	17490eu	1500-1600	USA, KTNB Salt Lk City UT	9930as		
1500-1600 as	Eqt Africa, R East Africa	9585af			1500-1600	USA, KWHR Naalehu HI	9355as		
1500-1550	Germany, Deutsche Welle	7195af	9735af	11965af	1500-1600	USA, Monitor Radio Intl	6110as	7125as	7215as
		17800af		15145af	1500-1600	USA, VOA Washington DC	9700as	9760as	15205me
1500-1600 mt	Guam, TWR/KTWR	11580as					6000na	7425na	15395as
1500-1600	Italy, AWR Europe	7230eu			1500-1600	USA, WEWN Birmingham AL	9930am	13760am	15105am
1500-1600 mtwh/vl	Italy, IRRS Milan	7125va			1500-1600	USA, WHRI Noblesville IN	15715eu		
1500-1600	Japan, NHK/Radio	9535na	9750as	11955as	1500-1600	USA, WINB Red Lion PA	7490na	13595na	
1500-1600	Jordan, Radio	9560eu			1500-1600	USA, WJCR Upton KY	9955am		
1500-1600 mtwhfa	Lebanon, Wings of Hope	9960me			1500-1600 as	USA, WRMI/R Miami Intl	15665eu		
1500-1600 vl	Liberia, Radio ELBC	7275do			1500-1600	USA, WVHA Green Bush ME	12160am	13845am	15685am
1500-1600	Malaysia, Radio	7295do			1500-1600	USA, WWCR Nashville TN	11830na	15215na	17760ca
1500-1600	Malaysia, RTM/Kota Kinab	5980do			1500-1600	USA, WYFR Okeechobee FL	6065af		
1500-1600	Malaysia, RTM/Kuching	7160do			1500-1600	Zambia, R Christian Voice	5925eu		
1500-1600	Malta, V of Mediterranean	11925eu			1520-1530 mtwtf	Estonia, Estonian Radio	11780as		
1500-1515	Mongolia, R Ulan Bator	7290as	12000na		1530-1600	Austria, R Austria Intl	7140as	7412as	9910as
1500-1525	Netherlands, Radio	9895as	13700as	15150as	1530-1545	India, All India Radio	9575as	11790as	11670me
1500-1600 occsnal	New Zealand, R NZ Intl	6100pa			1530-1600	Iran, VOIRI Tehran	9895as	15150as	
1500-1530	Nigeria, FRCN/Radio	4990do	7285do		1530-1600	Netherlands, Radio	21515me		
1500-1600	Nigeria, FRCN/Voice of	7255af			1530-1600 mtwhf	Portugal, Radio	5920eu	7130na	7150af
1500-1550	North Korea, R Pyongyang	9325eu	9977na	13785eu	1530-1600	Russia, Voice of	9500as	11640as	9800eu
1500-1600	Palau, KHBN/Voice of Hope	9965as			1545-1600	Vatican State, Vatican R			

## SELECTED PROGRAMS

## Sundays

- 1501 BBC (south as): Variable Drama. See S 1130.  
 1505 BBC (af): Education Express. See S 0435.  
 1505 BBC (am): From Our Own Correspondent. See S 0130.  
 1505 BBC (as pac): Sportsworld. The weekly sports magazine.  
 1505 BBC (eu): Sports Roundup. See S 0315.  
 1515 BBC (as pac): Variable Feature. See S 0115.  
 1515 BBC (eu): BBC English. For learners of English.  
 1525 BBC (am): Book Choice. Short book reviews every week.  
 1530 BBC (af): Variable Comedy/Quiz Feature. Panel quiz shows and satire.  
 1530 BBC (am): Variable Comedy/Quiz Feature. See S 1530.  
 1530 BBC (eu): New Ideas. Window on the world of technology, innovation and new products.

## Mondays

- 1500 BBC (as pac): East Asia Today. See S 2310.  
 1505 BBC (af): Focus on Africa. Up-to-the-minute reports on the day's events from all over the continent.  
 1505 BBC (as pac): Development '95. See M 1230.  
 1505 BBC (eu): Sports Roundup. See S 0315.  
 1505 BBC (south as): Sports Roundup. See S 0315.  
 1515 BBC (am): Variable Feature. See S 0115.  
 1515 BBC (eu): BBC English. See S 1515.  
 1515 BBC (south as): Variable Feature. See S 0115.  
 1530 BBC (af): Omnibus. See M 1130.  
 1530 BBC (eu): Global Concerns. See M 0145.

## Looking for a Good Antenna Handbook?

If you'd like a good source of information about antennas, you will be interested in **THE ANTENNA HANDBOOK** by Oem Small. Within its 200+, 8-1/2" x 11" pages, there is much material from past "Antenna Topics" columns plus a considerable amount of new material.

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- 1545 BBC (as pac): Sports Roundup. See S 0315.  
 1545 BBC (eu): Variable Music Feature. See S 0015.

## Tuesdays

- 1500 BBC (as pac): East Asia Today. See S 2310.  
 1505 BBC (af): Focus on Africa. See M 1505.  
 1505 BBC (as pac): On Screen. See S 1215.  
 1505 BBC (eu): Sports Roundup. See S 0315.  
 1505 BBC (south as): Sports Roundup. See S 0315.  
 1515 BBC (am): The Greenfield Collection. See S 1615.  
 1515 BBC (eu): BBC English. See S 1515.  
 1515 BBC (south as): Concert Hall. See S 1415.  
 1530 BBC (af): Variable Feature. See S 0115.  
 1530 BBC (eu): Development '95. See M 1230.  
 1545 BBC (as pac): Sports Roundup. See S 0315.  
 1545 BBC (eu): Health Matters. See M 0445.

## Wednesdays

- 1500 BBC (as pac): East Asia Today. See S 2310.  
 1505 BBC (af): Focus on Africa. See M 1505.  
 1505 BBC (as pac): The Learning World. See S 0030.  
 1505 BBC (eu): Sports Roundup. See S 0315.  
 1505 BBC (south as): Sports Roundup. See S 0315.  
 1515 BBC (am): Variable Feature. See S 0115.  
 1515 BBC (eu): BBC English. See S 1515.  
 1515 BBC (south as): From Our Own Correspondent. See S 0130.  
 1530 BBC (af): Discovery. See T 0230.  
 1530 BBC (am): The John Dunn Show. See S 0330.  
 1530 BBC (eu): Discovery. See T 0230.  
 1530 BBC (south as): Waveguide. See S 0350.  
 1540 BBC (south as): Book Choice. See S 1525.  
 1545 BBC (as pac): Sports Roundup. See S 0315.  
 1545 BBC (south as): On Screen. See S 1215.

## Thursdays

- 1500 BBC (as pac): East Asia Today. See S 2310.  
 1505 BBC (af): Focus on Africa. See M 1505.  
 1505 BBC (as pac): From Our Own Correspondent. See S 0130.  
 1505 BBC (eu): Sports Roundup. See S 0315.  
 1505 BBC (south as): Sports Roundup. See S 0315.  
 1515 BBC (am): The Learning World. See S 0030.  
 1515 BBC (eu): BBC English. See S 1515.

- 1515 BBC (south as): Assignment. See H 0130.  
 1530 BBC (af): Variable Feature. See S 0115.  
 1530 BBC (am): Megamix. See T 1615.  
 1530 BBC (eu): Network UK. See H 1430.  
 1545 BBC (as pac): Sports Roundup. See S 0315.  
 1545 BBC (south as): The Learning World. See S 0030.

## Fridays

- 1500 BBC (as pac): East Asia Today. See S 2310.  
 1505 BBC (af): Focus on Africa. See M 1505.  
 1505 BBC (as pac): Global Concerns. See M 0145.  
 1505 BBC (eu): Sports Roundup. See S 0315.  
 1505 BBC (south as): Sports Roundup. See S 0315.  
 1515 BBC (am): Concert Hall. See S 1415.  
 1515 BBC (eu): BBC English. See S 1515.  
 1515 BBC (south as): Variable Feature. See S 0115.  
 1530 BBC (af): Focus on Africa. See F 0130.  
 1530 BBC (eu): Focus on Faith. See F 0130.  
 1545 BBC (as pac): Sports Roundup. See S 0315.  
 1545 BBC (south as): Short Story. See S 0430.

## Saturdays

- 1505 BBC (af): Sportsworld. See S 1505.  
 1505 BBC (am): Sportsworld. See S 1505.  
 1505 BBC (as pac): Sportsworld. See S 1505.  
 1505 BBC (eu): Sportsworld. See S 1505.  
 1505 BBC (south as): Sportsworld. See S 1505.

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## FREQUENCIES

1600-1615	Albania, R Tirana Intl	7155eu	9760eu		1600-1700 vl	Slovakia, AWR	9455af		
1600-1630	Australia, Radio	5995pa	6060pa	6080pa	1600-1700	South Korea, R Korea Intl	5975as	9515af	9870af
		9710pa	9770as	11660pa	1600-1630	Sri Lanka, SLBC Colombo	9720as	15425as	
		11800pa			1600-1700	Swaziland, Trans World R	9500af		
1600-1700 vl	Australia, VL8A Alice Spg	2310do			1600-1640	UAE, Radio Dubai	13675eu	15320eu	15395me
1600-1700 vl	Australia, VL8K Katherine	2485do			1600-1700	United Kingdom, BBC London	3915as	6190af	6195eu
1600-1700 vl	Australia, VL8T Tent Crk	2325do					9515na	9740as	11750as
1600-1700	Bahrain, Radio	6010do					12095af	15070af	15260na
1600-1700 vl	Canada, CBC N Quebec Svc	9625do					17830af	21660af	15400eu
1600-1700	Canada, CFCX Montreal	6005do			1600-1615	United Kingdom, BBC London	5990as	9660as	17705eu
1600-1700	Canada, CFRX Toronto	6070do					21470af		17840na
1600-1700	Canada, CFVP Calgary	6030do			1600-1700	USA, KAIJ Dallas TX	13815am	15725am	
1600-1700	Canada, CHNX Halifax	6130do			1600-1700	USA, KTNB Salt Lk City UT	15590am		
1600-1700	Canada, CKZN St John's	6160do			1600-1700	USA, KWHR Naalehu HI	6120as		
1600-1700	Canada, CKZU Vancouver	6160do			1600-1700	USA, Monitor Radio Intl	9355af	21640af	
1600-1700 s	Canada, RCI Montreal	11955na	17820na		1600-1700	USA, VOA Washington DC	3970af	6110as	7125as
1600-1700	China, China Radio Intl	11575as	15110af	15130af			9645as	9700as	9760as
1600-1700	Costa Rica, R Peace Intl	6200am	9400am	15050am			12040af	13710af	15205as
1600-1700	Ecuador, HCJB Quito	6080do	15350eu	21455eu			15320af	15395as	15410af
1600-1700	Ethiopia, Radio	7165af	9560af				17785af	17895af	15445af
1600-1700	France, Radio France Intl	6175eu	9485me	11615af	1600-1700	USA, WEWN Birmingham AL	9455na	15695eu	
		12015af	15530af	11700af	1600-1700	USA, WHRI Noblesville IN	6120am	13760am	15105am
1600-1650	Germany, Deutsche Welle	6170as	7225as	7305as	1600-1700	USA, WINB Red Lion PA	15715eu		
		9585as	11795as	13790na	1600-1700	USA, WJCR Upton KY	7490na	13595na	
1600-1700	Guam, AWR/KSDA	9370as			1600-1700 as	USA, WRMI/R Miami Intl	9955am		
1600-1615 mt	Guam, TWR/KTWR	11580as			1600-1700	USA, WRNO New Orleans LA	15420am		
1600-1630 whfas	Guam, TWR/KTWR	11580as			1600-1700	USA, WVHA Green Bush ME	15665eu		
1600-1630	Iran, VOIRI Tehran	9575as	11790as		1600-1700	USA, WWCR Nashville TN	12160am	13845am	15685eu
1600-1700 mtwh/vl	Italy, IRRS Milan	7125va			1600-1700	USA, WYFR Okeechobee FL	11830na	15215na	15566eu
1600-1700	Jordan, Radio	9560eu			17760na				
1600-1630 mtwhfa	Lebanon, Wings of Hope	9960me					21525af	21745eu	
1600-1700 vl	Liberia, Radio ELBC	7275do			1600-1700	Zambia, R Christian Voice	6065af		
1600-1700	Malaysia, Radio	7295do			1615-1700	United Kingdom, BBC London	5975as	9510as	9630af
1600-1625	Netherlands, Radio	9895as	15150as		1615-1630	Vatican State, Vatican R	7250eu	9645eu	15420af
1600-1649 occsnal	New Zealand, R NZ Intl	6100pa			1630-1700	Australia, Radio	6060pa	6080pa	7260as
1600-1700	Nigeria, FRCN/Radio	4990do	7285do				9860pa	11660pa	9710pa
1600-1700	Nigeria, FRCN/Voice of	7255af			11880pa				
1600-1630	Pakistan, Radio	9435af	9470af	11570af	1630-1700	Canada, RCI Montreal	7150as	9550as	
		15555af	15675af	17660af	1630-1700 mtwhfa	Liberia, Radio ELWA	4760do		
		5905eu	5950eu	5965eu	1630-1700	Russia, Voice of	6110eu	7150na	7380as
1600-1700	Russia, Voice of	6035as	7205na	7345na	1630-1700	Zimbabwe, ZBC/Radio 4	3306do	3396do	9800eu
		7490eu	9550na	11920na	1640-21650 s	Rwanda, Radio	6055do		
		17780eu		15105af	1645-1700	Tajikistan, Radio	7245as		
1600-1700	S Africa, Channel Africa	7240af	15240af		1650-1700 mtwhf	New Zealand, R NZ Intl	6145pa		
1600-1700	Singapore, SBC Radio One	6155do							

## SELECTED PROGRAMS

## Sundays

- 1615 BBC (af): Variable Music Feature. See S 0015.  
 1615 BBC (am): Meridian. See S 0630.  
 1615 BBC (as pac): The John Dunn Show. See S 0330.  
 1615 BBC (eu): The Greenfield Collection. This classical music program replaces Ray on Record.  
 1615 BBC (south as): Letter from America. See S 0030.  
 1630 BBC (south as): Variable Feature. See S 0115.  
 1645 BBC (af): Waveguide. See S 0350.  
 1645 BBC (am): Britain Today. See S 0045.  
 1645 BBC (as pac): Short Story. See S 0430.  
 1655 BBC (af): Book Choice. See S 1525.

## Mondays

- 1615 BBC (af): Fast Track. The latest African sports news and action.  
 1615 BBC (am): Variable Feature. See S 0115.  
 1615 BBC (as pac): Multitrack: Hit List. The UK Top 20.  
 1615 BBC (eu): Variable Feature. See S 0115.  
 1615 BBC (south as): Omnibus. See M 1130.  
 1645 BBC (af): The World Today. Examines thoroughly a topical aspect of the international scene.  
 1645 BBC (am): Britain Today. See S 0045.  
 1645 BBC (as pac): Britain Today. See S 0045.  
 1645 BBC (south as): The World Today. See M 1645.

## Tuesdays

- 1615 BBC (af): Money Focus. African business magazine.  
 1615 BBC (am): Folk Routes. See T 0030.  
 1615 BBC (as pac): Megamix. Compendium of music, sport, fashion, health, travel, news and views for young people.  
 1615 BBC (eu): Concert Hall. See S 1415.  
 1615 BBC (south as): Megamix. See T 1615.  
 1630 BBC (am): Variable Feature. See S 0115.  
 1645 BBC (af): The World Today. See M 1645.  
 1645 BBC (am): Britain Today. See S 0045.  
 1645 BBC (as pac): Britain Today. See S 0045.  
 1645 BBC (south as): The World Today. See M 1645.

## Wednesdays

- 1615 BBC (af): Talkabout Africa. Telephone conversations with BBC correspondents on late-breaking African events.  
 1615 BBC (am): Meridian. See S 0630.  
 1615 BBC (as pac): Multitrack: X-Press. New pop records, interviews, news and competitions.  
 1615 BBC (eu): Variable Feature. See S 0115.  
 1615 BBC (south as): Discovery. See T 0230.  
 1645 BBC (af): The World Today. See M 1645.  
 1645 BBC (am): Britain Today. See S 0045.  
 1645 BBC (as pac): Britain Today. See S 0045.  
 1645 BBC (eu): Folk Routes. See T 0030.  
 1645 BBC (south as): The World Today. See M 1645.

## Thursdays

- 1615 BBC (af): The Jive Zone. Keep in the groove with all the latest sounds on the Afro music scene.  
 1615 BBC (am): Sports International. See H 0230.  
 1615 BBC (as pac): Variable Music Feature. See S 0015.  
 1615 BBC (eu): Variable Feature. See S 0115.  
 1615 BBC (south as): Network UK. See H 1430.  
 1645 BBC (af): The World Today. See M 1645.  
 1645 BBC (am): Britain Today. See S 0045.  
 1645 BBC (as pac): Britain Today. See S 0045.  
 1645 BBC (eu): Fourth Estate. NEW! John Eidinow and his team review the European press.  
 1645 BBC (south as): The World Today. See M 1645.

## Fridays

- 1615 BBC (af): African Perspective. See S 0631.  
 1615 BBC (am): Meridian. See S 0630.  
 1615 BBC (as pac): Multitrack: Alternative. See F 1430.  
 1615 BBC (eu): Music Review. See S 1415.  
 1615 BBC (south as): Science in Action. See S 0430.  
 1645 BBC (af): The World Today. See M 1645.  
 1645 BBC (am): Britain Today. See S 0045.  
 1645 BBC (as pac): Britain Today. See S 0045.  
 1645 BBC (south as): The World Today. See M 1645.

## Saturdays

- 1605 BBC (af): Sportsworld. See S 1505.  
 1605 BBC (am): Sportsworld. See S 1505.  
 1605 BBC (as pac): Sportsworld. See S 1505.  
 1615 BBC (eu): Sportsworld. See S 1505.  
 1615 BBC (south as): Sportsworld. See S 1505.

HAUSER'S HIGHLIGHTS  
HAWAII: KWHR

Summer schedule: 17510 from 2200, 17780 0400, 9930 0800, 6120 1600, 13625 1800, 15405 2000 (George Jacobs & Associates)

## JAPAN: RADIO JAPAN

[non] for Z-95, R. Japan relay changes include: at 0700-0800 add via BBC Ascension 17815; 2100-2200 Gabon on 11865 ex-11925; usual timeshift via Sackville from 0300 to 0100-0200, still 5960 (R. Japan Media Roundup via John Norfolk, Diane Mauer) see also CANADA

1700 UTC

1:00 PM EDT/10:00 AM PDT

## SHORTWAVE

GUIDE

1800 UTC

2:00 PM EDT/11:00 AM PDT

## FREQUENCIES

1700-1800	Australia, Radio	6060pa 9710pa 11880pa	6080pa 9860pa	7260as 11660pa	9580pa 11695pa	1800-1830 Albania, R Tirana Intl	7230eu 9730eu		
1700-1800 vl	Australia, VL8A Alice Spg	2310do				1800-1900 Algeria, R Algiers Intl	11715eu		
1700-1800 vl	Australia, VL8K Katherine	2485do				1800-1900 Australia, Radio	6060pa 11660as	6080pa 11695pa	9580pa 11880pa
1700-1800	Azerbaijan, Voice of	2325do				1800-1900 vl	2310do		
1700-1800	Bahrain, Radio	7160eu				1800-1900 vl	2325do		
1700-1800	Canada, CFCX Montreal	6010do				1800-1900	6010do		
1700-1800	Canada, CFRX Toronto	6005do				1800-1900	Bangladesh, Radio	7190eu	9647eu
1700-1800	Canada, CFVP Calgary	6070do				1800-1830	Belgium, R Vlaanderen Int	5910eu	9925af
1700-1800	Canada, CHNX Halifax	6030do				1800-1900	Bulgaria, Radio	7305eu	9700eu
1700-1800	Canada, CKZN St John's	6130do				1800-1900	Canada, CFCX Montreal	6005do	
1700-1800	Canada, CKZU Vancouver	6160do				1800-1900	Canada, CFRX Toronto	6070do	
1700-1800	China, China Radio Intl	4130as	7405af	9535as	11575af	1800-1900	Canada, CFVP Calgary	6030do	
1700-1800 as	Costa Rica, AWR Alajuela	5030am	9725am			1800-1900	Canada, CHNX Halifax	6130do	
1700-1800	Costa Rica, R Peace Intl	6200am	9400am	15050am		1800-1900	Canada, CKZN St John's	6160do	
1700-1730	Czech Rep, Radio Prague	5930as	7345eu	9420me		1800-1900	Canada, CKZU Vancouver	6160do	
1700-1800	Ecuador, HCJB Quito	6080do	15490eu	21455eu		1800-1900	Costa Rica, R Peace Intl	6200am	9400am
1700-1730	France, Radio France Intl	9485as	11700af			1800-1830	Czech Rep, Radio Prague	5930eu	7345eu
1700-1800 mtwh/vl	Italy, IRRS Milan	7125va				1800-1900	Ecuador, HCJB Quito	6080do	15490eu
1700-1800	Japan, NHK/Radio	6150na	9535na	9580as	11930as	1800-1830	Ghana, Ghana Broadc Corp	3366do	4915do
1700-1730	Jordan, Radio	9560eu				1800-1900	India, All India Radio	7412eu	9650me
1700-1800 vl	Liberia, Radio ELBC	7275do				1800-1900 mtwh/vl	Italy, IRRS Milan	7125va	
1700-1800 mtwhf	New Zealand, R NZ Intl	6145pa				1800-1900	Kenya, Kenya Broadc Corp	4885do	4935do
1700-1800	Nigeria, FRCN/Radio	3326do	4990do			1800-1900	Kuwait, Radio	11990na	
1700-1750	North Korea, R Pyongyang	9325eu	9640af	9977af	13785eu	1800-1830 mtwhfa	Lebanon, Voice of	6550eu	
1700-1750	Pakistan, Radio	7485eu	11570eu			1800-1900	Liberia, Radio ELBC	7275do	
1700-1755	Poland, Polish R Warsaw	6000eu	7270eu	7285eu		1800-1900	Liberia, Radio ELWA	4760do	
1700-1800	Russia, Voice of	5905me	5950eu	7115eu	7325na	1800-1830	Netherlands, Radio	6020af	9605af
		7345eu	7370eu	7490eu	9550na	1800-1849 mtwhf	New Zealand, R NZ Intl	6145pa	
		9890eu	11825na	11920na	11980as	1800-1830 s	Nigeria, FRCN/Radio	3326do	4990do
1700-1800	S Africa, Channel Africa	7240af				1800-1900	Norway, Radio Norway Intl	5960eu	
1700-1800 vl	Slovakia, AWR	7270as	9450as			1800-1900	Russia, Voice of	4940eu	5905me
1700-1715	Swaziland, Trans World R	7120af				1800-1900		7180as	7345eu
1700-1730	Switzerland, Swiss R Intl	6205af	9885af	13635me		1800-1900		9550eu	9860eu
1700-1720	Uganda, Radio	4976do				1800-1900 vl	Slovakia, AWR	13670af	
1700-1800	United Kingdom, BBC London	3955eu	5975as	6005af	6180eu	1800-1900 irreg	Sudan, Sudan Natl BC	9455af	
		6190af	6195eu	9410eu	9510as	1800-1900	Swaziland, Trans World R	9200af	
		9630af	9740as	11750as	11940af	1800-1845	Swaziland, Trans World R	3200af	
		12095af	15070af	15400af	15420af	1800-1900	United Kingdom, BBC London	9500af	
		17830af						3955eu	6005af
1700-1715	United Kingdom, BBC London	9515na	15260na			1800-1830	United Kingdom, BBC London	5975as	6180eu
1700-1745	United Kingdom, BBC London	3915as				1800-1900	USA, KAIJ Dallas TX	9410eu	9630af
1700-1800	USA, KAIJ Dallas TX	13815am	15725am			1800-1900	USA, KJES Mesquite NM	11955as	15070af
1700-1800	USA, KTNB Salt Lk City UT	15590am				1800-1900	USA, KTNB Salt Lk City UT	15420af	17830af
1700-1800	USA, KWHR Naalehu HI	7425as				1800-1900	USA, KWHR Naalehu HI	5975as	7160me
1700-1800	USA, Monitor Radio Intl	9355af	21640af			1800-1900	USA, Monitor Radio Intl	13815am	15725am
1700-1800	USA, VOA Washington DC	5900as	5990eu	6045as	6110as	1800-1900	USA, VOA Washington DC	15385na	
		7125as	7215as	7235as	9525as			15590am	
		9645as	9670af	9700eu	9760af			13625as	
		9770af	11895af	11920af	11945af			9355me	15665eu
		12040af	13710af	15205as	15395as			4875af	21640af
		15445af	17895af					9760eu	11920af
1700-1800	USA, WEWN Birmingham AL	9455na	15695eu			1800-1900	USA, WEWN Birmingham AL	13710af	15580af
1700-1800	USA, WHRI Noblesville IN	6120am	13760am	15105am		1800-1900	USA, WHRI Noblesville IN	9455na	15695eu
1700-1800	USA, WINB Red Lion PA	15715eu				1800-1900	USA, WINB Red Lion PA	9495am	13625am
1700-1800	USA, WJCR Upton KY	7490na	13595na			1800-1900	USA, WJCR Upton KY	15715eu	13760eu
1700-1800 smtwhf	USA, WMLK Bethel PA	9465eu				1800-1900	USA, WMLK Bethel PA	7490na	13595na
1700-1800 as	USA, WRMI/R Miami Intl	9955am				1800-1900 as	USA, WRMI/R Miami Intl	9465eu	
1700-1800	USA, WRNO New Orleans LA	15420am				1800-1900	USA, WRNO New Orleans LA	9955am	
1700-1800	USA, WVHA Green Bush ME	17612af				1800-1900	USA, WVHA Green Bush ME	15420am	
1700-1800	USA, WWCR Nashville TN	12160am	13845am	15685eu		1800-1900	USA, WWCR Nashville TN	17612af	
1700-1800	USA, WYFR Okeechobee FL	15566eu	17760na			1800-1845	USA, WYFR Okeechobee FL	12160am	13845am
1700-1800	Zambia, R Christian Voice	6065af				1800-1900	USA, WYFR Okeechobee FL	15566eu	15665eu
1700-1800	Zimbabwe, ZBC/Radio 4	3306do	3396do	4828do		1800-1900	Yemen, Yemeni Rep Radio	17760na	9780as
1705-1800	Ghana, Ghana Broadc Corp	3366do				1800-1900	Zambia, R Christian Voice	6065af	
1715-1730 mtwhf	Swaziland, Trans World R	7120af				1800-1900	Zimbabwe, ZBC/Radio 4	3306do	3396do
1715-1800	United Kingdom, BBC London	7160me				1830-1900	Kazakhstan, Radio Almaty	5035eu	5260eu
1730-1800	Austria, R Austria Intl	9665me	11780as					5970eu	5905eu
1730-1800	Moldova, R Moldova Intl	7235eu				1830-1845	Netherlands, Radio	6015af	6020af
1730-1800	Netherlands, Radio	6020af	9605af	11655af		1830-1900	Rwanda, Radio	9895af	15315af
1730-1800	Romania, R Romania Intl	9510af	9750af	11740af	11940af	1830-1900	Slovakia, R Slovakia Intl	6055do	
1730-1800	Russia, Voice of	7130me	7340eu	9520na	9720eu	1830-1900	Slovakia, R Slovakia Intl	5915eu	7345eu
1730-1745	Sweden, Radio	6065eu				1830-1900	United Kingdom, BBC London	3255af	
1730-1800	Vatican State, Vatican R	7305af	9695af	9725af	11625af	1830-1900	Yugoslavia, Radio	6100eu	9720af
1745-1800	Armenia, Radio Yerevan	4810eu	4990eu	7480eu		1833-1900	Cote D' Ivoire, RDTV	11920do	
1745-1800	Bangladesh, Radio	7190eu	9647eu			1840-1850	Greece, Voice of	9935af	11645af
1745-1800 mtwhf	Canada, RCI Montreal	5995me	11935me	13610eu	15325eu	1845-1900 irreg s	Mali, RDTV Malienne	4783do	4835do
		17820eu				1850-1900	New Zealand, R NZ Intl	11910pa	5995do
1745-1800	India, All India Radio	7412eu	9650me	9950me	11620eu				
		11935af	13750as	15075me					

# Bob's Bargain Bin

Most equipment in **Bob's Bargain Bin** has only slight cosmetic damage. **All equipment comes with the Grove warranty and most have the original manufacturer's warranty.** **UPS ground shipping is free with the purchase of any item,** but if the item is returned for any other reason than defect, shipping charges will be deducted from your refund.



## Receivers

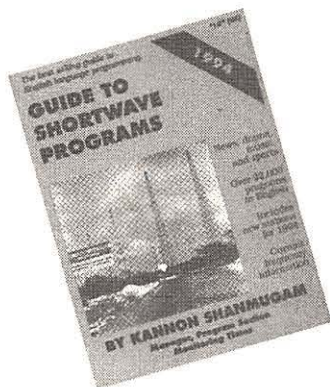
URCV02	SONY 2010 .....	\$329.95
URCV04	SANGEAN ATS-803 .....	\$138.95
URCV07	KENWOOD R-5000 .....	\$1009.95
URCV09	SANGEAN ATS 818CS .....	\$205.95
URCV22	YACHT BOY 400 .....	\$169.95



# Scanners

UCVR1	800-950 MHz Scan. converter .....	\$79.95
USCN 14	ICOM R-100 .....	\$649.95
USCN16	PRO-2026 .....	\$199.95
USCN17	PRO-43 .....	\$293.95
USCN27	AOR 8000 .....	\$640.95
USCN28	PRO-2035 .....	\$389.95

# Books



UBOK10B	Radio Tech Modification, 6B .....	\$15.95
UBOK22	94 Police Call Vol 2 .....	\$5.95
UBOK23	94 Police Call Vol 3 .....	\$5.95
UBOK25	94 Police Call Vol 5 .....	\$5.95
UBOK26	94 Police Call Vol 6 .....	\$5.95
UBOK27	94 Police Call Vol 7 .....	\$5.95
UBOK29	94 Police Call Vol 9 .....	\$5.95
UBOK41	Tune in on Telephone Calls .....	\$9.95
UBOK 43	Guide to Shortwave Programs .....	\$8.95
UBOK50	3rd Ed. World Ham Net Dir. ....	\$9.95
UBOK52	US Maritime Frequency .....	\$20.95
UBOK69	Shortwave Radio for Beginners .....	\$9.95
UBOK75	Traffic Radar Handbook .....	\$9.95
UBOK78	Master Frequency File .....	\$20.95
UBOK86	2nd Ed. Worldwide Aero Com. ....	\$15.95

## Miscellaneous

UACC16	Metrowest Pro-Pack 1200 .....	\$54.95
UACC95	AC/DC Adaptor 1.2 Volt .....	\$5.95
UACC105	High Stability Crystal .....	\$79.95
UACC160	ScanStar Com. software .....	\$109.95
UANT01	Scanner Beam Antenna .....	\$45.95
UANT9	Wideband Discone Antenna .....	\$80.95
UANT13	Windshield mt. Scammer Antenna.....	\$20.95
UANT 21	Select-A-Tenna .....	\$55.95
UCLK01	24 Hour Clock .....	\$20.95
UCLK04	24 World Map Desk Clock .....	\$20.95
UCPL63B	Coupler, AM/FM to BNC .....	\$9.95
UCTR8	Opto. Freq. Scout #2 .....	\$409.95
UDEMO1	MD100 Decoder .....	\$150.95
UDEMO1B	MD100 Decoder w/12v battery .....	\$170.95
UEDEM200	MD200 Decoder .....	\$220.95
UGP22	ICOM Global Positioning System .....	\$489.95
UHDP01	Luxury Headset .....	\$12.95
UPHN03	Uniden 9100 Phone .....	\$279.95
UPR-150	Lowe PR-150 Preselector .....	\$339.95
UPRE04	Preamplifier .....	\$44.95
UPWR02	Innova Powerpack .....	\$40.95
UID100	9" CRT Monitor .....	\$89.95
UID200	9" CRT Monitor (high res.) .....	\$109.95
<b>Accessories for MJF Digital Decoders</b>		
UACC39	MJF-1282B Commodore Adapter .....	\$19.95
UACC40A	MJF-1289 HI-RES Enhancer5 1/4 .....	\$31.95
UACC41	ICOM 8 Pin (MJF-5084) .....	\$6.95
UACC42	YAESU 8 Pin (MJF-5080) .....	\$6.95
UACC44	Kenwood HT (9MFJ 5026) .....	\$6.95
UACC45	MJF-5024 Cable .....	\$6.95
UACC46	MJF-5086 Cable .....	\$6.95
UACC61	MJF-1290 Amiga Adaptor .....	\$27.95
UACC70	Metrowest Pro-Charge 7 .....	\$34.95

# Grove Enterprises

**P.O. Box 98, Brasstown, NC 28902; (800)438-8155; (704) 837-9200**

## FREQUENCIES

1900-2000	Australia, Radio	6060pa 7260as 11660pa	6080pa 9560as 11695pa	6150as 9580pa 11880pa	7240pa 9860pa	2000-2100 2000-2100	Algeria, R Algiers Intl Australia, Radio	11715eu 6060pa 9580pa 11855as	11745eu 6080pa 9860pa 11880pa	6150pa 11660pa	7260as 11695pa
1900-2000 vl	Australia, VL8A Alice Spg	2310do				2000-2100 vl	Australia, VL8A Alice Spg	2310do			
1900-2000 vl	Australia, VL8K Katherine	2485do				2000-2100 vl	Australia, VL8K Katherine	2485do			
1900-2000	Australia, VL8T Tent Crk	2325do				2000-2100 vl	Australia, VL8T Tent Crk	2325do			
1900-1945	Bahrain, Radio	6010do				2000-2100	Bahrain, Radio	6010do			
1900-2000	Bangladesh, Radio	7190as	9647eu			2000-2020	Brazil, Radiobras	15268eu			
1900-2000	Brazil, Radiobras	15268eu				2000-2100 vl	Canada, CBC N Quebec Svc	9625do			
1900-2000	Canada, CFCX Montreal	6005do				2000-2100	Canada, CFCX Montreal	6005do			
1900-2000	Canada, CFRX Toronto	6070do				2000-2100	Canada, CFRX Toronto	6070do			
1900-2000	Canada, CFVP Calgary	6030do				2000-2100	Canada, CFVP Calgary	6030do			
1900-2000	Canada, CHNX Halifax	6130do				2000-2100	Canada, CHNX Halifax	6130do			
1900-2000	Canada, CKZN St John's	6160do				2000-2100	Canada, CKZN St John's	6160do			
1900-2000	Canada, CKZU Vancouver	6160do				2000-2100	Canada, CKZU Vancouver	6160do			
1900-2000	China, China Radio Intl	6955af				2000-2100	China, China Radio Intl	4130as	8260as	9440af	9920eu
1900-2000 mtwhf	Costa Rica, AWR Alajuela	5030am	9725am			2000-2100	Costa Rica, R Peace Intl	11715na	15110af		
1900-2000	Costa Rica, R Peace Intl	9400am	15050am	17910am		2000-2100	Ecuador, HCJB Quito	6200am	9400am	15050am	
1900-1930	Cote D' Ivoire, RDTV	11920do				2000-2050	Germany, Deutsche Welle	6080do			
1900-2000	Ecuador, HCJB Quito	6080do				2000-2030	Greece, Voice of	5960eu	7285eu		
1900-1950	Germany, Deutsche Welle	7110af	9665af	9670af	9765af	2000-2010	Indonesia, Voice of	3366do	4915do		
		11785af	11810af	11865af	13790af	2000-2010	Iran, VOIRI Tehran	9375eu			
		15145af	15425af			2000-2010	Israel, Kol Israel	9675as			
		3975eu	6110eu	7220eu		2000-2010	Italy, IRRS Milan	7260af	9022eu		
		7412eu	9650me	9950me	11620eu	2000-2010	Kenya, Kenya Broadc Corp	7405na	7465na	9435eu	11603na
		11935af	13750as	15075me		2000-2015 mtwh/vl	Kuwait, Radio	15640af			
1900-2000 mtwh/vl	Italy, IRRS Milan	7125va				2000-2100	Liberia, Radio ELBC	7125va			
1900-2000	Japan, NHK/Radio	6150as	7140au	9535na	9580au	2000-2100	Liberia, Radio ELWA	4885do	4935do		
		11850au				2000-2100	Netherlands, Radio	11990eu			
1900-2000	Kenya, Kenya Broadc Corp	4885do	4935do			2000-2100	New Zealand, R NZ Intl	4760do			
1900-2000	Kuwait, Radio	11990eu				2000-2025	Nigeria, FRCN/Radio	6020af	9605af	9860af	9895af
1900-2000	Liberia, Radio ELBC	7275do				2000-2050	Nigeria, FRCN/Voice of	11655af	15315af	17605af	
1900-2000	Liberia, Radio ELWA	4760do				2000-2050	North Korea, R Pyongyang	11910pa			
1900-1925	Netherlands, Radio	6015af	6020af	9605af	9860af	2000-2100 vl	Papua New Guinea, NBC	3326do	4990do		
		9895af	15315af	17605af		2000-2050	Philippines, R Pilipinas	7255af			
1900-2000	New Zealand, R NZ Intl	11910pa				2000-2050	Romania, R Romania Intl	6576eu	9345as	9640af	9977na
1900-2000	Nigeria, FRCN/Voice of	7255af				2000-2100 vl	Russia, Voice of	4890do	6135eu	7285eu	
1900-2000 vl	Papua New Guinea, NBC	4890do	9675do			2000-2025	Poland, Polish R Warsaw	9675do	6135eu	7285eu	
1900-1930	Philippines, R Pilipinas	11890as				2000-2030 mtwhf	Portugal, Radio	6000eu	9780eu	9815eu	
1900-2000	Romania, R Romania Intl	5995eu	6105eu	6190eu	7195eu	2000-2100	Russia, Voice of	6130af	7135eu	7170eu	7205eu
1900-2000	Russia, Voice of	6110eu	7170eu	7205eu	7345eu			6085eu	9530eu	9550eu	9800na
		7370eu	7490eu	9550eu	9800na			7345eu	9890na	12030eu	12050as
		9890eu	11825as	12050na	15205af			9890na	15385na		
1900-1915	Rwanda, Radio	6055af				2000-2030	Russia, Voice of	5920eu	6110me	7400na	
1900-2000 vl	Slovakia, AWR	9455as				2000-2100 vl	Slovakia, AWR	5920eu	6110me	7400na	
1900-2000	South Korea, R Korea Intl	5975eu				2000-2100 vl	Solomon Islands, SIBC	6055eu	9455af		
1900-2000	Spain, R Exterior Espana	9675af				2000-2045 s	Swaziland, Trans World R	5020do	9545do		
1900-2000	Swaziland, Trans World R	3200af	3240af			2000-2100	Turkey, Voice of	3240af			
1900-1930	Switzerland, Swiss R Intl	3985eu	6135af	6165eu	9770af	2000-2015	Uganda, Radio	9445eu	5026do		
		9885af	11640af	13635af	11905eu	2000-2030	United Kingdom, BBC London	4976do	6190af	7160me	12095me
1900-2000	Thailand, Radio	9655eu	9700eu	11855eu				15070af	17830af		
1900-1915	Uganda, Radio	4976do	5026do			2000-2100	United Kingdom, BBC London	3255af	3955eu	6005af	6180eu
1900-2000	United Kingdom, BBC London	3255af	3955eu	6005af	6180eu			6195eu	7325eu	9410eu	9740as
		6190af	6195eu	7160me	9410eu			11750s	11955as	15400af	
		9630af	9740as	11955as	12095me			13815am	15725am		
		15070af	15400af	17830af		2000-2100	USA, KAIJ Dallas TX	15590am			
1900-2000	USA, KAIJ Dallas TX	13815am	15725am			2000-2100	USA, KATN Salt Lk City UT	15590am			
1900-2000	USA, KATN Salt Lk City UT	15590am				2000-2100 as	USA, KVOH Los Angeles CA	17775am			
1900-2000 as	USA, KVOH Los Angeles CA	17775am				2000-2100	USA, Monitor Radio Intl	9355eu	13770eu		
1900-2000	USA, KWHR Naalehu HI	13625as				2000-2100	USA, VOA Washington DC	3980eu	6040eu	7415af	9700eu
1900-2000	USA, Monitor Radio Intl	9355me	15665eu	17510af				9760af	11855af	13710af	15160af
1900-2000	USA, VOA Washington DC	3980eu	6040eu	7415af	9525pa			15205me	15410af	15445af	15580af
		9700af	9760af	11870as	11920af			17725af			
		12040af	13710af	15180pa	15410af	2000-2100	USA, WEWN Birmingham AL	9455na	15375na		
		15445af	15580af	17800af	19379af	2000-2100	USA, WHRI Noblesville IN	11980am	13760eu		
1900-2000	USA, WEWN Birmingham AL	9455eu	15375eu	15695eu		2000-2100	USA, WINB Red Lion PA	12160eu			
1900-2000	USA, WHRI Noblesville IN	9495am	13625am	13760eu		2000-2100	USA, WJCR Upton KY	7490na	13595na		
1900-2000	USA, WINB Red Lion PA	12160eu				2000-2100	USA, WMLK Bethel PA	9465eu			
1900-2000	USA, WJCR Upton KY	7490na	13595na			2000-2100 as	USA, WRMI/R Miami Intl	9955am			
1900-2000	USA, WMLK Bethel PA	9465eu				2000-2100	USA, WRNO New Orleans LA	15420am			
1900-2000 as	USA, WRMI/R Miami Intl	9955am				2000-2100	USA, WWCR Nashville TN	11970eu	13845am	15685am	
1900-2000	USA, WRNO New Orleans LA	15420am				2000-2045	USA, WYFR Okeechobee FL	15252af			
1900-2000	USA, WVHA Green Bush ME	9930af				2000-2100	USA, WYFR Okeechobee FL	13695af			
1900-2000	USA, WWCR Nashville TN	11970am	13845am	15685am		2000-2030	Vatican State, Vatican R	7355af	9645af	11625af	
1900-2000	USA, WYFR Okeechobee FL	17760af				2000-2030	Zambia, R Christian Voice	6065af			
1900-2000	Zambia, R Christian Voice	6065af				2000-2100	Zimbabwe, ZBC/Radio 4	3306do	3396do	4828do	
1900-2000	Zimbabwe, ZBC/Radio 4	3306do	3396do	4828do		2005-2100	Austria, R Austria Intl	5945eu	6155eu		
1930-2000	Austria, R Austria Intl	5945eu	6155eu			2015-2100 f/vl	Finland, YLE/Radio	9665me	13730af	11755eu	
1930-2000 mtwhfa	Finland, YLE/Radio	9665me	13730af	11755eu		2025-2045	Iran, VOIRI Tehran	6120eu	9022eu		
1930-2000	Iran, VOIRI Tehran	6120eu	9022eu			2030-2100 mt	Mongolia, R Ulan Bator	7260af	7290na		
1930-2000	Mongolia, R Ulan Bator	7290na	13670na			2030-2100 as	Netherlands, Radio	6020af	9605af	9860af	9895af
1930-2000	Netherlands, Radio	6020af	9605af	9860af	9895af	2030-2100 asmtwh	Poland, Polish R Warsaw	11655af	15315af	17605af	
		11655af	15315af	17605af		2030-2100	South Korea, R Korea Intl	6000eu	6135eu	7285eu	
1930-2000	Poland, Polish R Warsaw	6000eu	6135eu	7285eu		2030-2100 mtwhfa	Uganda, Radio	7250eu			
1930-2000 a	South Korea, R Korea Intl	7250eu						4976do	5026do		
1935-1955	Italy, RAI Rome	7275eu	9575eu	11905eu				7275eu	9575eu	11905eu	
1945-2000 t	Belarus, Radio Minsk	5940eu	7105eu	7210eu	7405eu			9655eu	9700eu	11835eu	11905eu
1950-2000	Vatican State, Vatican R	4010eu	5882eu					10059as	12025as	15010as	
						2045-2100	India, All India Radio	7412eu	9910au	9950eu	11620eu
								11715pa	15225pa		
						2051-2100	New Zealand, R NZ Intl	15115pa			

## FREQUENCIES

2100-2200	Australia, Radio	6060pa	6080pa	7240pa	7260as
		11855as	11880pa	11955pa	
2100-2130 vl	Australia, VL8A Alice Spg	2310do			
2100-2130 vl	Australia, VL8K Katherine	2485do			
2100-2130 vl	Australia, VL8T Tent Crk	2325do			
2100-2115	Bahrain, Radio	6010do			
2100-2130	Belgium, R Vlaanderen Int	5910eu	6035eu		
2100-2200	Bulgaria, Radio	7105eu	9700eu		
2100-2200	Canada, CFCX Montreal	6005do			
2100-2200	Canada, CFRX Toronto	6070do			
2100-2200	Canada, CFVP Calgary	6030do			
2100-2200	Canada, CHNX Halifax	6130do			
2100-2200	Canada, CKZN St John's	6160do			
2100-2200	Canada, CKZU Vancouver	6160do			
2100-2200	Canada, RCI Montreal	5995eu	7260eu	9725eu	11945eu
		13650eu	13690eu	15140eu	15325eu
		17820eu			
2100-2200	China, China Radio Intl	4130as	6950eu	8260as	9920eu
2100-2130	China, China Radio Intl	11715af	15110af		
2100-2200	Costa Rica, R Peace Intl	7385am	9400am	15050am	
2100-2200	Cuba, Radio Havana Cuba	11720eu			
2100-2130	Czech Rep, Radio Prague	5930eu	7345eu	9485eu	
2100-2150	Germany, Deutsche Welle	6185as	7225af	9615af	9670as
		9690af	9765as	11785as	11810af
		15270af			
2100-2130	Hungary, Radio Budapest	3955eu	6110eu	7220eu	
2100-2200	India, All India Radio	7412eu	9910eu	9950eu	11620au
		11715au	15225au		
2100-2200 f/vl	Italy, IRRS Milan	7125va			
2100-2200	Japan, NHK/Radio	6035eu	9560as	9580af	11800eu
		11875eu	11925eu		
2100-2115	Japan, NHK/Radio	9660as	11915as		
2100-2200 mtwhfa	Liberia, Radio ELWA	4760do			
2100-2125	Netherlands, Radio	9860af	9895af		
2100-2200	New Zealand, R NZ Intl	15115pa			
2100-2200	Nigeria, FRCN/Radio	3326do	4990do		
2100-2130 s	Norway, Radio Norway Intl	6015eu	9590eu		
2100-2200 mtwhfa	Palau, KHBN/Voice of Hope	11980as			
2100-2200 vl	Papua New Guinea, NBC	4890do	9675do		
2100-2200	Romania, R Romania Intl	5955eu	5990eu	6105eu	6190eu
		7195eu			
2100-2200	Russia, Voice of	5905eu	5920eu	5965eu	7135as
		7170eu	7205na	7330as	7350as
		7380eu	9550eu	9890eu	15580na
		7285eu			
2100-2150	S Africa, Channel Africa	5960eu			
2100-2115	Sierra Leone, SLBS	3316do			
2100-2200 vl	Slovakia, AWR	6055eu	7270af		
2100-2200 vl	Solomon Islands, SIBC	5020do	9545do		
2100-2200	South Korea, R Korea Intl	6480eu	15575eu		
2100-2200	Spain, R Exterior Espana	6125eu			
2100-2200	Syria, Radio Damascus	12085eu	15095na		
2100-2110	Uganda, Radio	4976do	5026do		
2100-2200	Ukraine, R Ukraine Intl	4820eu	5940eu	6020eu	7205eu
		7240eu	7320eu	7405eu	
2100-2200	United Kingdom, BBC London	3255af	3915as	3955eu	5975na
		5990as	6005af	6160as	6180eu
		6195eu	7325eu	9410eu	9740as
		11750sa	11955as	13660af	15400eu
		13815am	15725am		
2100-2200	USA, KAIJ Dallas TX	15590am			
2100-2200	USA, KTBN Salt Lk City UT	17775am			
2100-2200 s	USA, KVOH Los Angeles CA	9355na	13770eu		
2100-2200	USA, Monitor Radio Intl	6040eu	6125eu	7415af	9760eu
2100-2200	USA, VOA Washington DC	11870pa	13710af	15185pa	15205me
		15410af	15445af	15580af	17725af
		17735pa	17800af	21485af	
		7435na	15375na		
2100-2200	USA, WEWN Birmingham AL	9495am	11980am	13760am	
2100-2200	USA, WHRI Noblesville IN	11915eu			
2100-2200	USA, WINB Red Lion PA	7490na	13595na		
2100-2200	USA, WJCR Upton KY	9465eu			
2100-2200	USA, WMLK Bethel PA	15420am			
2100-2200	USA, WRNO New Orleans LA	12160eu	13845am	15685am	
2100-2200	USA, WWCR Nashville TN	7355eu	11580af	13695af	
2100-2200	USA, WYFR Okeechobee FL	5882eu			
2100-2110	Vatican State, Vatican R	6100na	6185eu		
2100-2130	Yugoslavia, Radio	3306do	3396do	4828do	
2100-2200	Zimbabwe, ZBC/Radio 3	9900eu			
2115-2200	Egypt, Radio Cairo	6110am	15390am	17715am	
2115-2130	United Kingdom, BBC London	9580pa	9610as	9645as	9660pa
2130-2200	Australia, Radio	11695pa	15365pa	17860pa	
		4835do			
2130-2200 vl	Australia, VL8A Alice Spg	5025do			
2130-2200 vl	Australia, VL8K Katherine	4910do			
2130-2200	Belgium, R Vlaanderen Int	9935sa			

## 2200 UTC

2130-2200	Iran, VOIRI Tehran	9670au			
2130-2200	Liberia, Radio ELWA	4760do			
2130-2200	Russia, Voice of	7150na	7400na		
2130-2200	Sweden, Radio	6065eu	9655eu		
2130-2200 mtwhf	USA, WRMI/R Miami Intl	9955am			
2200-2300 vl	Australia, VL8A Alice Spg	11695pa	11855as	11880pa	11955pa
2200-2300 vl	Australia, VL8K Katherine	13755as	15365pa	17795pa	17860pa
2200-2300 vl	Australia, VL8T Tent Crk	4835do			
2200-2300 vl	Canada, CBC N Quebec Svc	5025do			
2200-2300	Canada, CFCX Montreal	4910do			
2200-2300	Canada, CFRX Toronto	9625do			
2200-2300	Canada, CFVP Calgary	6005do			
2200-2300	Canada, CHNX Halifax	6070do			
2200-2300	Canada, CKZN St John's	6030do			
2200-2300	Canada, CKZU Vancouver	6130do			
2200-2230	Canada, RCI Montreal	6160do			
		5995eu	7260eu	11705as	11945eu
		13650eu	13690eu	15140eu	15325eu
		17820eu			
2200-2230	China, China Radio Intl	3985eu	7170eu		
2200-2300	Costa Rica, R Peace Intl	7385am	9400am	15050am	17910am
2200-2300	Cuba, Radio Havana Cuba	6180na			
2200-2245	Egypt, Radio Cairo	9900eu			
2200-2300	India, All India Radio	7412eu	9910eu	9950eu	11620au
		11715au	15225au		
2200-2230	Iran, VOIRI Tehran	9670au			
2200-2300 f/vl	Italy, IRRS Milan	7215va			
2200-2215 as/vl	Italy, IRRS Milan	7215va			
2200-2225	Italy, RAI Rome	9710as	11800as	15330as	
2200-2300	Malaysia, Radio	7295do			
2200-2300	Malaysia, RTM/Kota Kinab	5980do			
2200-2300	New Zealand, R NZ Intl	15115pa			
2200-2205	Nigeria, FRCN/Radio	3326do	4990do		
2200-2230 s	Norway, Radio Norway Intl	5905sa	6120sa		
2200-2300 mtwhfa	Palau, KHBN/Voice of Hope	11980as			
2200-2300 vl	Papua New Guinea, NBC	4890do	9675do		
2200-2300	Russia, Voice of	5905eu	5920eu	6055eu	7135as
		7150na	7205eu	7300eu	7350eu
		7380as	7400na	9550eu	9620na
2200-2215	Sierra Leone, SLBS	3316do			
2200-2300 vl	Slovakia, AWR	7270af	11610af		
2200-2235 vl	Solomon Islands, SIBC	5020do	9545do		
2200-2205	Syria, Radio Damascus	12085na	15095na		
2200-2300	Taiwan, VO Free China	5810eu	9850eu		
2200-2300	Turkey, Voice of	7185me	9445na	11710eu	
2200-2300	UAE, Radio Abu Dhabi	9605na	9770na	11885na	
2200-2300	United Kingdom, BBC London	3955eu	5975na	6195eu	7110as
		9590na	9915sa	11695as	11750sa
		11955as	15400eu		
2200-2215	United Kingdom, BBC London	6180eu	9410me		
2200-2300	USA, KAIJ Dallas TX	13815am	15725am		
2200-2300	USA, KTBN Salt Lk City UT	15590am			
2200-2300	USA, Monitor Radio Intl	7510eu	9430as	13625as	17555am
2200-2300	USA, VOA Washington DC	6035as	7215as	9705as	9770as
		9890as	11760as	12080af	13710af
		15185au	15290as	15305as	17735as
		17820as			
2200-2300	USA, WEWN Birmingham AL	7425na			
2200-2300	USA, WHRI Noblesville IN	9495am	13760am	17510am	
2200-2300	USA, WINB Red Lion PA	11915eu			
2200-2300	USA, WJCR Upton KY	7490na	13595na		
2200-2300 a	USA, WRMI/R Miami Intl	9955am			
2200-2300	USA, WRNO New Orleans LA	15420am			
2200-2300	USA, WVHA Green Bush ME	9855eu			
2200-2300	USA, WWCR Nashville TN	12160am	13845am	15685am	
2200-2245	USA, WYFR Okeechobee FL	11580af	13695af		
2203-2210	Croatia, Croatian Radio	5920eu	7370eu	9890eu	13830eu
2223-2256	Eqt Guinea, Radio Africa	15189af			
2230-2300	Russia, Voice of	9890as			
2230-2300	Sweden, Radio	6065eu			
2240-2250	Greece, Voice of	9375au	9425au		
2245-2300	Ghana, Ghana Broadc Corp	3366do	4915do		
2245-2300	India, All India Radio	9705as	9950as	11745as	13750as
		15145as			
2245-2300 mtwhf	USA, Voice of the OAS	9670na	11835na	15155na	
2245-2300	Vatican State, Vatican R	6150as	7305as	9600au	11830pa

## FREQUENCIES

2300-2315	Armenia, Radio Yerevan	7480eu	9480eu			2300-0000 vl	Papua New Guinea, NBC	4890do	9675do		
2300-0000	Australia, Radio	9580pa	9610as	9645as	9660pa	2300-0000	Russia, Voice of	7300na	9620na	9685na	13640as
		9850as	11695as	11855as	13755as			15425na	17655na	17890as	
		15240pa	15365pa	17795pa	17860pa			3316do			
2300-0000 vl	Australia, VL8A Alice Spg	4835do				2300-2317	Sierra Leone, SLBS	9530as			
2300-0000 vl	Australia, VL8K Katherine	5025do				2300-0000	Singapore, R Singapor. Int	9605na	9770na	11710na	
2300-0000 vl	Australia, VL8T Tent Crk	4910do				2300-0000	UAE, Radio Abu Dhabi	5975na	6175na	6195as	7110as
2300-0000 vl	Canada, CBC N Quebec Svc	9625do				2300-0000	United Kingdom, BBC London	7180as	7325na	9580as	9590na
2300-0000	Canada, CFCX Montreal	6005do						9915sa	11750sa	11945as	11955as
2300-0000	Canada, CFRX Toronto	6070do						15340as			
2300-0000	Canada, CFVP Calgary	6030do				2300-2315	United Kingdom, BBC London	15400eu			
2300-0000	Canada, CHNX Halifax	6130do				2300-0000	USA, KAIJ Dallas TX	13740am	13815am		
2300-0000	Canada, CKZN St John's	6160do				2300-0000	USA, KTBN Salt Lk City UT	15590am			
2300-0000	Canada, CKZU Vancouver	6160do				2300-0000	USA, KWHR Naalehu HI	11980as			
2300-0000 as	Canada, RCI Montreal	9535am	9755na	11845na	11920na	2300-0000	USA, Monitor Radio Intl	7510eu	9430as	13625pa	17555am
		11940na				2300-0000	USA, VOA Washington DC	6035as	7215as	9705as	9770as
2300-2330 mtwhf	Canada, RCI Montreal	5960na	9535na	9755na	11845na			9890as	11760as	15185au	15290as
		11940na						15305as	17735as	17820as	
2300-0000 mtwhf	Costa Rica, AWR Alajuela	5030am	9725am			2300-0000	USA, WEWN Birmingham AL	7425na	11820sa		
2300-0000	Costa Rica, R Peace Intl	7385am	9400am	15050am		2300-0000	USA, WHRI Noblesville IN	5745am	9495am	17510am	
2300-0000	Ecuador, HCJB Quito	6080do				2300-0000	USA, WINB Red Lion PA	11915eu			
2300-0000	Egypt, Radio Cairo	9900na				2300-0000	USA, WJCR Upton KY	7490na	13595na		
2300-0000	Guam, AWR/KSDA	11980as				2300-0000 as	USA, WRMI/R Miami Intl	9955am			
2300-0000 vl	Guatemala, AWR	5980ca				2300-0000	USA, WVHA Green Bush ME	9855eu			
2300-0000	India, All India Radio	9705as	9950as	11745as	13750as	2300-0000	USA, WWCR Nashville TN	5065am	13845am	15685am	
		15145as				2325-2336	Lebanon, Voice of	6550eu			
2300-0000 f/vl	Italy, IRRS Milan	7125va				2325-2336	Armenia, Radio Yerevan	9685na	11920na	11970na	
2300-0000	Japan, NHK/Radio	6055eu	6155eu	9560as	9580as	2330-2345	Belgium, R Vlaanderen Int	6035na	9930sa		
2300-2330 sm	Lithuania, Radio Vilnius	7150na				2330-0000 mtwhf	Canada, RCI Montreal	5960na	9755na		
2300-0000	Malaysia, Radio	7295do				2330-0000	Finland, YLE/Radio	5990na	6015na	9680as	
2300-0000	Malaysia, RTM/Kota Kinab	5980do				2330-0000	Netherlands, Radio	6020na	6165na		
2300-0000	New Zealand, R NZ Intl	15115pa				2330-0000	Russia, Voice of	7125na			
2300-2305	Nigeria, FRCN/Radio	3326do	4990do			2330-0000	Sweden, Radio	11910as			
2300-2350	North Korea, R Pyongyang	11700na	13650na			2330-0000	Vietnam, Voice of	12025as	15010as		
2300-2330 s	Norway, Radio Norway Intl	5905na	6115sa	6120na		2335-2345	Greece, Voice of	9375sa	9425sa	11595sa	
2300-0000 mtwhf	Palau, KHBV/Voice of Hope	11980as									

## SELECTED PROGRAMS

## Sundays

- 2310 BBC (am): East Asia Today. See S 2310.  
 2310 BBC (as pac): East Asia Today. News, analysis, press reviews and reports from BBC correspondents.  
 2330 BBC (am): Short Story. See S 0430.  
 2330 BBC (as pac): Letter from America. See S 0030.  
 2345 BBC (am): Write On. See S 0145.  
 2345 BBC (as pac): Sports Roundup. See S 0315.  
 2355 BBC (am): Words of Faith. See S 0555.

## Mondays

- 2310 BBC (am): East Asia Today. See S 2310.  
 2310 BBC (as pac): East Asia Today. See S 2310.  
 2330 BBC (am): Outlook. See M 1405.  
 2330 BBC (as pac): The World Today. See M 1645.  
 2345 BBC (as pac): Sports Roundup. See S 0315.  
 2355 BBC (am): Words of Faith. See S 0555.

## Tuesdays

- 2310 BBC (am): East Asia Today. See S 2310.  
 2310 BBC (as pac): East Asia Today. See S 2310.  
 2330 BBC (am): Outlook. See M 1405.  
 2330 BBC (as pac): The World Today. See M 1645.  
 2345 BBC (as pac): Sports Roundup. See S 0315.  
 2355 BBC (am): Words of Faith. See S 0555.

## Wednesdays

- 2310 BBC (am): East Asia Today. See S 2310.  
 2310 BBC (as pac): East Asia Today. See S 2310.  
 2330 BBC (am): Outlook. See M 1405.  
 2330 BBC (as pac): The World Today. See M 1645.  
 2345 BBC (as pac): Sports Roundup. See S 0315.  
 2355 BBC (am): Words of Faith. See S 0555.

## Thursdays

- 2310 BBC (am): East Asia Today. See S 2310.  
 2310 BBC (as pac): East Asia Today. See S 2310.  
 2330 BBC (am): Outlook. See M 1405.  
 2330 BBC (as pac): The World Today. See M 1645.  
 2345 BBC (as pac): Sports Roundup. See S 0315.  
 2355 BBC (am): Words of Faith. See S 0555.

## Fridays

- 2310 BBC (am): East Asia Today. See S 2310.  
 2310 BBC (as pac): East Asia Today. See S 2310.  
 2330 BBC (am): Outlook. See M 1405.  
 2330 BBC (as pac): The World Today. See M 1645.  
 2345 BBC (as pac): Sports Roundup. See S 0315.  
 2355 BBC (am): Words of Faith. See S 0555.

## Saturdays

- 2310 BBC (as pac): Variable Feature. See S 0115.  
 2315 BBC (eu): Jazz for the Asking. See S 0630.  
 2330 BBC (am): The John Dunn Show. See S 0330.  
 2340 BBC (as pac): Book Choice. See S 1525.  
 2345 BBC (as pac): Sports Roundup. See S 0315.  
 2345 BBC (eu): Sports Roundup. See S 0315.



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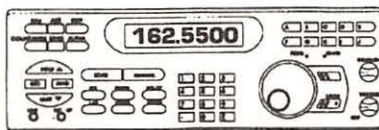
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6-Conductor 40' (12.2 m) extension cable 7878-K	\$21.95
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Thermometer with transparent calendar & clock display by OSI TC188-K	\$19.95
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The new Bearcat 890XLT gives you pure scanning satisfaction with amazing features like Turbo Scan to scan and search up to 100 channels per second. This base and mobile scanner is ideal for weather watchers because it has a built-in tone activated **Weather Alert Feature**. Other features include **Auto Store** - Automatically stores all active frequencies within the specified bank(s). **Auto Recording** - This feature lets you record channel activity from the scanner onto a tape recorder. You can even get an optional **CTCSS Tone Board** (Continuous Tone Control Squelch System) which allows the squelch to be broken during scanning only when a correct CTCSS tone is received. For maximum scanning enjoyment, order the following optional accessories: **PS001** Cigarette lighter power cord for temporary operation from your vehicle's cigarette lighter \$14.95; **PS002** DC power cord - enables permanent operation from your vehicle's fuse box \$14.95; **MB001** Mobile mounting bracket \$14.95; **BC002** CTCSS Tone Board \$54.95; **EX711** External speaker with mounting bracket & 10 feet of cable with plug attached \$19.95. The BC890XLT comes with AC adapter, telescopic antenna, owner's manual and one year limited warranty from Uniden.

## CB/GMRS Radios



A National Weather Service (NWS) receiver with automatic emergency broadcast activation has been added to the legendary Cobra 29 CB radio. The integrated NWS receiver in the Cobra 29LTDXW will automatically activate to receive emergency announcements about severe weather and travel conditions. A special tone-alert signal broadcast by the NWS activates the weather receiver and overrides any CB radio reception for monitoring the warning message.

Cobra 29LTDXW-K CB/Weather Alert	\$129.95
Cobra 25LTDXW-K CB/Weather Alert	\$109.95
Cobra HH40-K1 CB 40 ch. Handheld	\$89.95
Ranger RCI2970-K 100 watt 10 meter	\$369.95
Ranger RCI2950-K 25 watt 10 meter	\$244.95
Uniden GMR100-K1 GMRS Handheld	\$149.95
Uniden WASHINGTON-K SSB CB Base	\$189.95
Uniden GRANTXL-K1 SSB CB Mobile	\$129.95
Uniden PRO538W-K CB & Weather	\$59.95



## Talking Weather

Now your weather station can talk to callers. Call 313-994-9000 for a demonstration. The Talking Weather Station (TWS) from Innovative Tech Works, lets anyone phone your Davis Weather Monitor II and hear the weather. Here's how it works. You setup the TWS with most IBM PC 80286 or faster compatible computers with a 40 MB hard disk. Requires MS-DOS version 5.0 or later with 1 MB of RAM. Add phone lines and your own personal messages or promotional advertising. Callers are automatically greeted with your voice giving them the weather and your messages. Several times a minute, the TWS software will poll the Weatherlink and will update the voice library files to make your spoken report. A single line card, order # IT1-K is only \$489.95. A two line card is order # IT2-K for \$939.95. A complete turnkey system for commercial use is available, order # ITPRO2-K starting at \$3,999.95.

## VHF Transceiver

### RELM® WHS150-K Transceiver

Mfg. suggested list price \$481.67/CE price \$339.95

Severe weather spotters depend on the RELM WHS150 transceiver for direct two-way communications with their police or fire department, civil defense agency or ham radio repeater. The WHS150 is our most popular programmable five watt, 16 channel handheld transceiver that has built-in CTCSS, which may be programmed for any 39 standard ELA tones. Frequency range 148.000 to 174.000 MHz. Will also work 144.000-148.000 MHz with slightly reduced performance. The full function, DTMF compatible keypad also allows for DTMF Encode/Decode and programmable ANI. Weighing only 1.55 oz., it features dealer programmable synthesized frequencies either simplex or half duplex in both 5.0 and 6.25 KHz increments. Other features include scan list, priority channel, selectable scan delay, selectable 5 watt/1 watt power levels, liquid crystal display, time-out timer and much more. When you order the WHS150 from the Weather Bureau, you'll get a complete package deal including antenna, battery, belt clip and user operating instructions. Other accessories are available. A leather carrying case with rivet belt loop, part #CWHB is \$49.95; rapid charge battery charger, part #CWHB is \$69.95; speaker/microphone, part #MWHB is \$54.95; extra alkaline battery pack, part #BP007 is \$39.95. The radio technician maintaining your radio system must order programming instructions part #P150 for \$18.00 to activate this radio. FCC license required for United States operation.

## Other neat stuff

Grundig Satellit 700-K portable shortwave receiver with 512 memory & AC adapter	\$389.95
Grundig Yacht Boy 400-K1 digital portable shortwave receiver - 40 memory presets	\$189.95
Grundig Yacht Boy 250-K portable shortwave receiver	\$139.95
Sangean AT5800-K portable 20 memory shortwave receiver	\$269.95
Sangean AT5800-K1 portable shortwave receiver w/AC adapter 9 memory/SP/CLAL	\$139.95
Sangean AT5800-K portable 45 memory shortwave receiver	\$159.95
Sangean AT5818-KC portable shortwave receiver with cassette recorder	\$209.95
Uniden EXP9100-K 900 MHz 2 line cordless phone	\$289.95
Uniden EXP9100-K 900 MHz 1 line cordless phone	\$269.95
Cobra CP912-K 900 MHz spread spectrum cordless phone	\$249.95
Bogen PB1000-K Digital two-line advanced voice mail system & answering machine	\$279.95
Bogen PB0018-K memory expansion module, doubles recording time to 36 minutes	\$79.95
FANS P161P-K 60 name/number caller ID, unswatched call blocker, automatic paging	\$149.95
SN1 ID200-K Bouncer name/number caller ID, call reject, forward to machine	\$89.95
ICOM GP21K-K1 handheld global positioning system (GPS)	\$499.95
WR200-K weather radio with National Weather Service storm alert	\$39.95
RELM WHS150-K VHF handheld 5 watt, 16 channel transceiver	\$339.95
RELM WHS150-K VHF base, 16 channel synthesized transceiver	\$289.95
Ranger RCI2950-K 25 watt 10 meter ham radio transceiver	\$239.95
Ranger RCI2970-K 100 watt 10 meter ham radio transceiver	\$369.95
Uniden LRD1000W-K Super Wideband Laser/Radar Detector	\$139.95
ME2-K Map Expert CD Rom for IBM PC by Delorme Mapping	\$299.95
HCPC-K HamCall CD Rom for IBM PC by Budmaster Publishing	\$39.95
ANTX-K VHF scanner/VHF transmitting antenna PL259 connector	\$29.95
ANTX-MB-K magnet mount scanner antenna w/ BNC connector	\$29.95
ANTX-MOT-K magnet mount scan antenna w/Motorola plug	\$29.95
ANTX-MPL-K magnet mount scan antenna with PL259 connector	\$29.95
ANTX-GM-K glass mount scanner antenna with BNC connector	\$29.95
ANTX-MOT-K glass mount scanner antenna with Motorola jack	\$29.95

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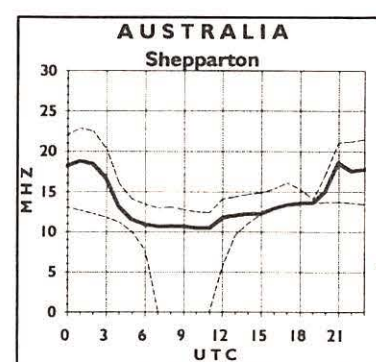
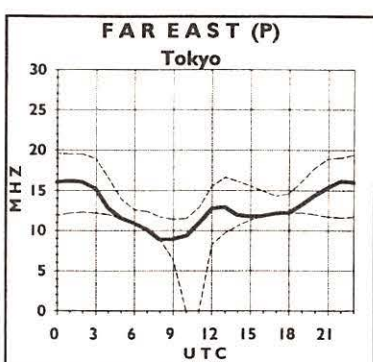
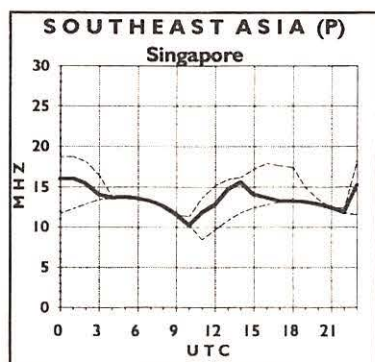
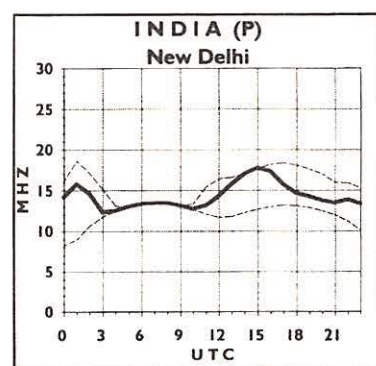
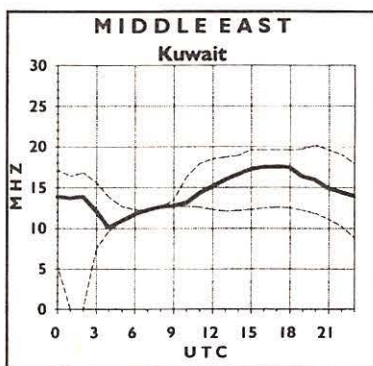
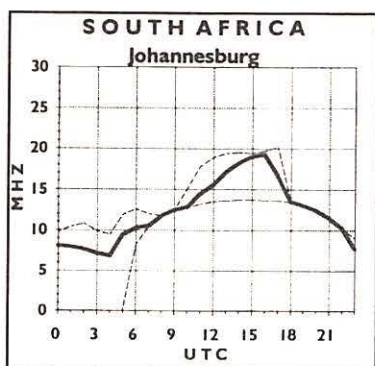
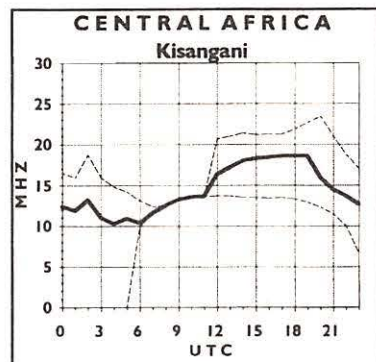
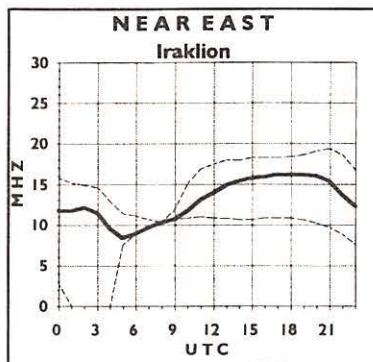
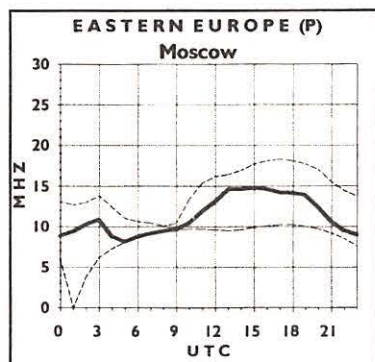
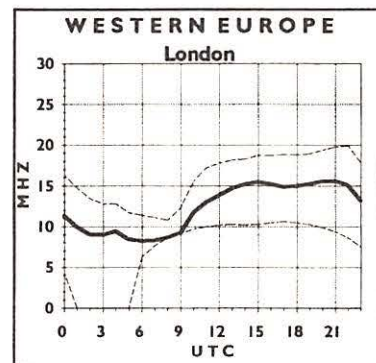
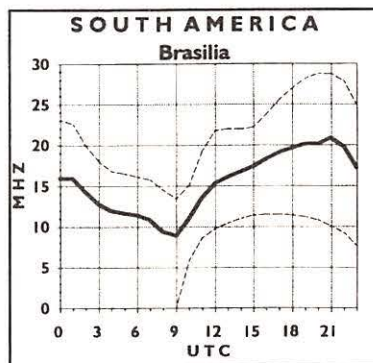
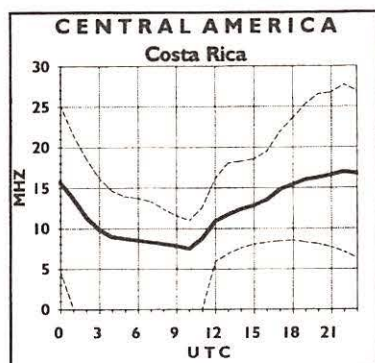
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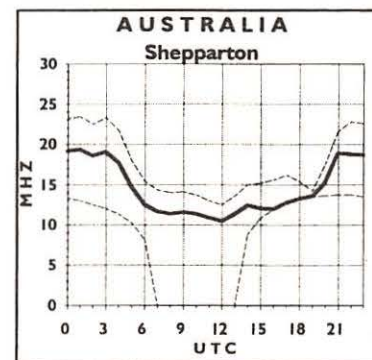
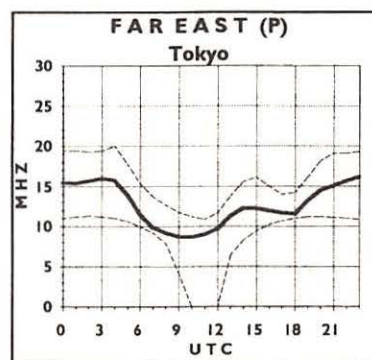
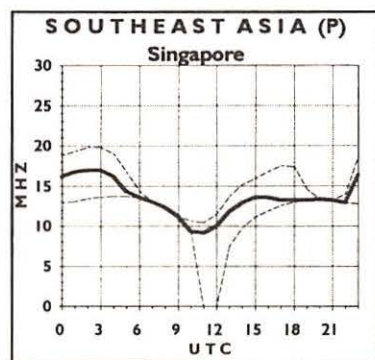
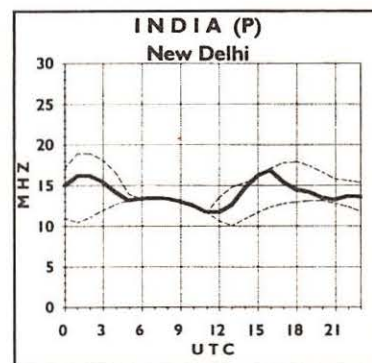
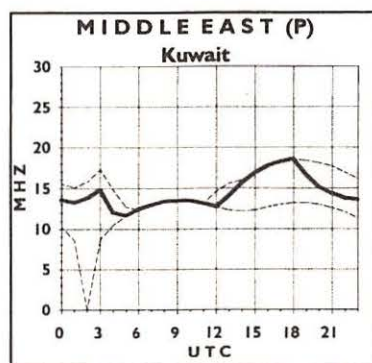
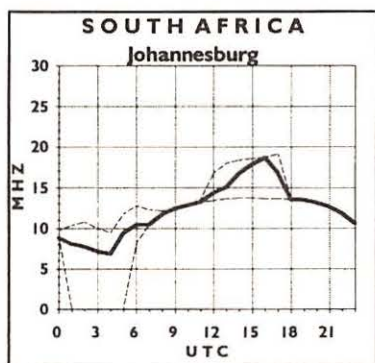
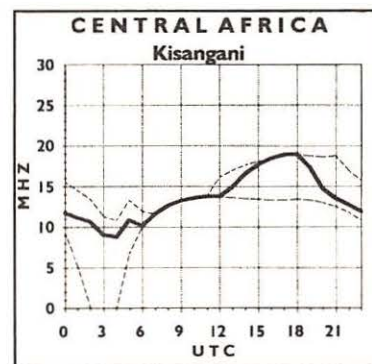
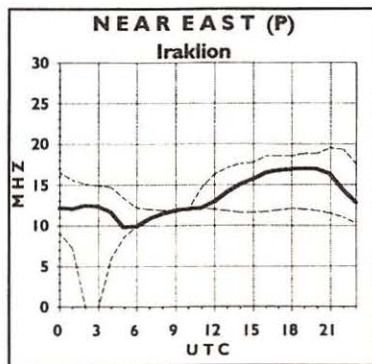
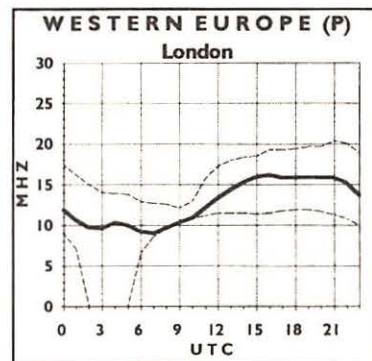
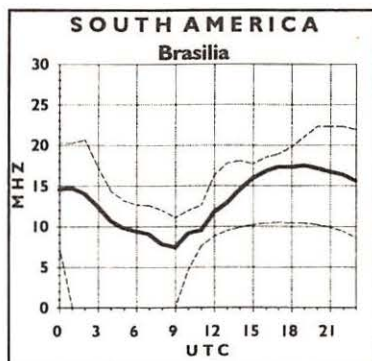
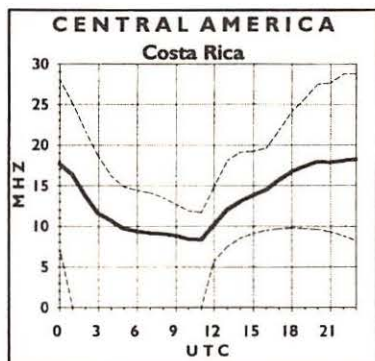
# Propagation conditions: Eastern United States

**How to use the propagation charts:** Propagation charts can be an invaluable aid to the DXer in determining which frequencies are likely to be open at a given time. To use the propagation charts, choose those for your location. Then look for the one most closely describing the geographic location of the station you want to hear. The Sun Spot Number used this month for forecasting purposes is 12.



# Propagation Conditions: Western United States

Once you've located the correct charts, look along the horizontal axis of the graph for the time you are listening. The top line of the graph shows the maximum usable frequency (MUF), the heavy middle line is the frequency for best reception, or optimum working frequency (OWF), and finally, the bottom line is the lowest usable frequency (LUF). You will find the best reception along the heavy middle line. Circuits labeled (P) cross the polar auroral zone. Expect poor reception on these circuits during ionospheric disturbances.



## 100 Years of Radio: An Idea Whose Time Had Come

**J**ust 100 years ago Guglielmo Marconi began a series of brilliant experiments that ultimately led him, and those that followed, to the technology we know today as "radio communications." In honor of this early work the International Telecommunications Union (ITU), as well as some sections of the International Amateur Radio Union (IARU) have proclaimed 1995 the "birthyear" of radio communications.

Marconi's work laid the practical groundwork that has led to the pleasures of radio which we now enjoy, including monitoring, DXing, amateur radio, scanning, AM/FM and TV broadcasting, and the many other fascinating aspects of radio communication which are so popular and, indeed, essential in today's world. It is very fitting, then, that this year we honor a man of so great a contribution to the field of radio as Marconi.

### ■ The "Father" of Radio

Marconi's work on wireless began in 1894 after he read the obituary of Heinrich Hertz, the man who first convincingly demonstrated electromagnetic waves to the scientific world. Reading of Hertz's achievements led Marconi to ponder the possibilities of utilizing Hertz's findings as a basis for wireless signalling. He cut short his vacation and headed for home to begin working on this idea. By 1895 he had sent wireless signals across a space of two miles, thus turning his vision into reality.

For his wireless communication system Marconi borrowed Hertz's idea of utilizing the spark-coil as a transmitter to produce his signals, and of using the halfwave dipole antenna to radiate and receive them. For the signal detector he used a device developed by Edouard Branly: the coherer. This device allowed him to attain much greater sensitivity and distance than the simple, visible-spark detectors used by Hertz.

Marconi also contributed various inventions of his own: for example, the familiar grounded, vertical, quarterwave antenna. He devised this antenna by rotating one element of a Hertzian halfwave dipole from its horizontal orientation to a vertical position, and attaching it to a vertical metal cylinder mounted on a pole. He then substituted a metal plate for the other element and placed the metal plate



**TOP:** Two men whose driving ambition shaped the course of radio: David Sarnoff and Guglielmo Marconi visit the RCA Communications transmitting center at Rocky Point, NY, in 1933 (NBC photo provided by Maury Midlo). **BOTTOM:** Italian bank note, courtesy Giovanni Serra.

on the ground. Even today, many persons who are knowledgeable in the field of antennas call a grounded, vertical, quarterwave antenna a "Marconi."

As his work progressed Marconi was able to communicate over greater and greater distances, persevering in demonstrating the value of wireless, even when Italy, his home country, could see no value in his system. Ultimately, government officials in England became interested in his success at sending wireless signals through space, and much of his subsequent work was done in that country.

Perhaps the most memorable moment in the history of wireless came in 1901 as the world heard in awe and admiration that Marconi had sent wireless signals completely across the Atlantic Ocean. There was utterly no doubt now that wireless telegraphy was about to become a major contender in the field of commercial and military communications. Stockholders in companies which owned

transatlantic telegraph cables began to take very serious and concerned notice of this new means of communications, and companies were soon formed to capitalize on the commercial possibilities which it offered. The age of wireless communication was off and running!

### ■ Others Who "Invented" Radio

That Marconi made many important contributions to the field of radio is undisputed; without question he was the pivotal figure in the early development of wireless communication. Nevertheless, it is also true that there

were many other persons working on similar systems of their own design during the same period of history. Some of them demonstrated wireless communication systems very similar to Marconi's, and some even produced their systems earlier than Marconi produced his.

In fact, the question of "Who discovered radio?" does not have a simple answer—at least, not one which can be substantiated to everyone's satisfaction. Therefore, it is fitting that other contributors to radio's history should be mentioned in this tribute to the discovery of

radio.

Long before Marconi's work was started, various scientists had pointed out the possibility of electromagnetic waves (what we now also call "radio waves," which could travel through space without connecting wires. We find that as early as 1832 the Englishman Michael Faraday wrote, "I am inclined to compare the diffusion of magnetic forces from a magnetic pole to the vibrations upon the surface of disturbed water, to those of air in the phenomenon of sound, i.e., I am inclined to think the vibratory theory will apply to these phenomena as it does to sound, and most probably to light."

As early as 1837 Joseph Henry, in the U.S.A., was able to receive and detect the electromagnetic signals which result from lightning discharges; his reports indicate that he understood the oscillatory nature of these waves and the similarity of their action to that of light waves.

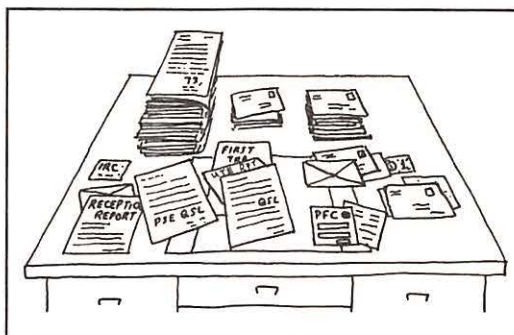
Then, in 1864, Maxwell, the great Scottish mathematician and physicist who also came to see heat, light, and other manifestations of the electromagnetic waves as part of the same spectrum, gave us the famous "Maxwell's Equations." These equations indicated in mathematical terms that electromagnetic waves were a physical reality. Maxwell's Equations are now basic mathematical tools in radio communication engineering.

In 1888, the German physicist Heinrich Hertz, following Maxwell's lead, performed experiments which convinced the scientific world that the electromagnetic waves predicted by Maxwell's equations did indeed exist, and that they could travel through space without intervening wires to complete their circuit. Marconi then utilized Hertz's findings as a basis for his own work.

However, there were other persons who produced working wireless systems prior to Hertz's work. In 1871, Elihu Thomson, an American, developed a system with transmitting components similar to those later used by Marconi, and Thomson used his system to transmit wireless signals for short distances at the school where he taught.

In 1880, an Englishman, David Hughes, demonstrated his "experiments upon aerial transmission" to a group of eminent scientists, sending and receiving signals over a distance of 500 yards. Unfortunately for him, the scientists to which he demonstrated his work convinced him that his system utilized only induction rather than the new waves that we now realize were the basis of his success. He was discouraged by this negative evaluation and didn't realize what he had discovered until Hertz's later work became known. In Germany, at about the same time as Hughes's experiments, Ludtge discovered a similar system.

In the U.S.A., as early as 1893, the legendary Nikola Tesla developed, and then widely demonstrated, a working wireless communication system. Much later—five months after Tesla's death in 1943—Tesla's system was judged by the United States Supreme Court to have preceded Marconi's. In 1894, Sir Oliver



*Snapshots in DXing History: Marconi's desk in the summer of 1895, a few days after his first successful transmission of the letter "S" in CW to his brother, located just a mile away! (Thanks to George Karayannopoulos)*

Lodge, an English scientist who had earlier come very close to demonstrating the existence of wireless waves prior to Hertz, transmitted wireless signals 150 yards with a system which he had devised.

However, perhaps the best-known contender with Marconi for the invention of wireless telegraphy was the Russian, Alexander S. Poppov, who described his wireless telegraph to the Russian Physical Society in 1895. Poppov also reportedly developed the grounded vertical antenna prior to Marconi's discovery of that design.

Even so, in the same year that Marconi's and Poppov's early work was being done, Captain Henry B. Jackson of the British Navy began working on the idea of sending signals through space with Hertzian apparatus; this was before he had heard of Marconi. Jackson's work was held confidential at the time, and therefore was not well known. About the same time as Marconi was pursuing his work, Adolphus Slaby—a German scientist sometimes called "the German Marconi"—was also working on the transmission of wireless signals. Slaby reported that he was unable to transmit no more than 100 meters with his system, until he was able to study Marconi's system with its improved antenna.

There were many other persons who, along with Marconi and the others just discussed, contributed to the history of the development of radio. This short review has purposely omitted reference to the many "non-radio" wireless systems based on electromagnetic induction as well as to that of Mahlon Loomis, whose successful wireless system seems also to have functioned on the basis of phenomena other than radio waves.

#### ■ In Summary

As you see, even in this short survey of the "inventors of radio," there are

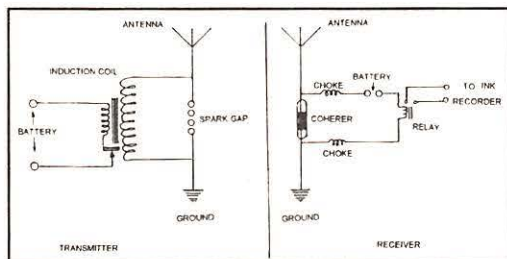
many persons who preceded or paralleled Marconi in transmitting and/or receiving signals through space. Some of them were scientists whose discoveries would become part of Marconi's system. Others of his predecessors were inventors who produced working wireless communication systems before Marconi had even begun his work in this area. But even though it is true that there were many who toiled and contributed to producing successful wireless communication, it is nonetheless fitting that Marconi's name be remembered as the man whose dedicated and pioneering efforts were the primary force in bringing practical wireless communication to the world.

#### ■ Signals and Circuits from the Past

I have prepared a tape cassette recreating of the sounds of early wireless spark-gap transmitters sending code, including a simulated emergency call with the old "CQD" distress signal which was later replaced by the "SOS" distress call more familiar to us today. The cassette presents the sound of signals as they were heard through early-day headphones using old-time crystal-detector receivers.

To prepare this cassette I constructed a small spark-gap transmitter and a crystal-detector receiver with headphones; the transmitter and receiver were connected by a closed-circuit for the recordings, because spark transmission is no longer legal. Off-the-air lightning crashes and static were added for realism.

If you'd like a copy of this recording, and a memorial certificate commemorating Marconi's work, complete with circuit diagrams of an early transmitter and receiver, drop me a line at *Monitoring Times* and enclose \$4.50 to cover cost of the cassette, handling, and mailing.



**FIGURE 1:** Spark gap transmitter and coherer receiver of a type used by Marconi

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## Skip Time!

I was 12 years old, and had just fixed my first TV. Let's see, OK, there's channel 10, and channel 6, channel 4 is coming in just fine, and channel 2. Channel 2? There's no channel 2 in Milwaukee, what is this? TV Bingo?

It was the early 1970's, and my first experience with sporadic-E skip. (By the way, the channel 2 station turned out to be CKCK-TV, Regina, Saskatchewan. They weren't able to play TV Bingo that night; their phone lines were jammed with calls from curious viewers in Wisconsin and Illinois!)

As you read this, the summer sporadic-E (abbreviated Es) season is getting underway. This is the time to fill your TV and FM logs with distant DX you won't get any other way. The season continues through July; there's a secondary, less intense, season around Christmas.

Many FM/TV DXers consider Es the most exciting DX mode. It can seem to pop up out of nowhere, and brings signals of local strength. Distances are greater than any other mode, with 1000-mile reception common, and stations as far away as 1500 miles can be seen/heard without exotic equipment or antennas.

### ■ When to check for Es

As the term "sporadic-E" implies, this is a sporadic and unpredictable mode of propagation. Unlike the much more common tropospheric bending, Es may last only a few seconds, and rarely lasts more than three hours. Since nobody knows what causes Es (though many DXers and radio hams *think* they know!) there is no way to predict an opening. All you can do is know when openings are likely, and stay alert.

There are two peak times of day for Es. A morning peak happens around 11am local time. And there's an evening peak around 7pm local. But Es can happen at any time of day or night, and most years there's at least one report of skip at 4am. Off-season openings are not unheard-of either; indeed, in 1994 skip was reported every month except March and October.

### ■ How to identify an Es opening

Es openings always start on low frequencies and move up. Channel 2 is affected first,

Intense openings may affect channel 6; if you see skip on channel 6, start checking FM. It is possible for skip to affect the high-band TV channels 7-13, but it's extremely rare. It's believed impossible for skip to affect UHF. Es signals are usually very strong; at my location 25 miles from their transmitter,

I've seen WKRN-TV channel 2 totally wiped out by skip signals.

If you have local stations on the low channels 2-6, your first indication of skip will be co-channel interference to your local stations. Weak interference looks like dozens of little black lines or bars in the picture. As the opening strengthens, the bars become more intense. At some point, you see the synchronization signals, wider vertical and horizontal bars. Once a signal reaches this strength, you may be able to read lettering on the interfering signal, superimposed on your local station's picture.

In extreme cases, the DX signal can become so strong that your local station is actually weaker than the DX—your local becomes the interference! Of course, if you have open low channels with no local signals, Es will show up as a station simply appearing on a usually-empty channel.

Interestingly, more intense skip openings cover *shorter* distances. If you're a CBER, ham, or scanner enthusiast, you can use this characteristic to help predict TV and FM openings. When the skip on CB or the 10-meter ham band is under 800 miles, it's time to start checking channel 2; if the skip on channel 2 is under 800 miles, check FM.

The 6-meter ham band is an even better predictor of channel 2 skip, as are two-way transmitters in the 48 MHz area. Indeed, a programmable scanner allows you to track an



WYHY Nashville is another potential skip catch. Look for Y107 if you're in New England, Florida, or the Kansas/Colorado/Nebraska area.

opening all the way from the CB channels to the TV band.

### ■ What to expect

Es openings are characterized by rapid and deep fading. You may have a local-quality signal one minute, and the DX may be totally gone 10 seconds later—only to return with an even stronger signal. You may also have more than one DX target on the same channel; this makes identifying your DX even more challenging, as the two (or more) stations swap places on your speakers.

These openings are also area-specific. For example, if you're DXing near New York City and you see a Minneapolis station, other DX targets will also be in Minnesota, Iowa, and western Wisconsin. You normally wouldn't expect to see Florida at the same time. (However, at the peak of the season, it's not unusual to have two different openings, in different directions, at the same time. This can be quite exciting, too!)

Skip has both minimum and maximum distance limits. You shouldn't expect to see anything less than maybe 500 miles distant, nor anything more than 1500 miles away. Keep that in mind when trying to identify your catches. While rare, there are double-hop openings which can stretch your DX to 2000 miles or more; some New England DXers have actually seen European TV via multiple-hop openings.

# Q107 PRESERVING THE WILD LIFE

Toronto's Best Rock

## PLEASE... DON'T DRINK AND DRIVE

CILQ-FM Toronto, "Q107," is a potential skip catch for readers in the deep South or the western Plains.

### ■ But I don't have a real antenna

It doesn't matter. When I say Es signals can reach local strength, I mean it! These signals are LOUD! Seriously, even a small portable TV with built-in whip antenna, or a tiny personal stereo, can DX sporadic-E. I've logged dozens of skip signals on my car radio; one day last summer, my commute to work was made more enjoyable by the music of XET-FM (94.1MHz) from Monterey, Mexico.

Of course, to DX TV you do need some kind of antenna; a set connected to cable won't do. (though if your town is some distance from the TV towers, Es interference may affect your cable company, too) Even rabbit ears will work. Indeed, if you're relatively close to a low-channel station, a smaller antenna may actually work better, by reducing the amount of "splatter" from your local station.

And as in any radio pursuit, a bigger antenna will certainly yield more DX. I've been quite successful with a Radio Shack VU-175 on a 15' pole; some serious DXers use much larger antennas. But these systems are definitely not necessary to have fun with skip.

### ■ Bits and Pieces

• It's every broadcast engineer's nightmare: a tower collapse. Bob Kozlark sent an article from *Radio World* describing the disaster that struck KTVZ-TV and five FM stations in the Bend, Oregon area (see picture on p7 of April MT). A moving van, delivering a new transmitter for KQAK-FM, snagged a guy wire for a 200' U.S. Forest Service tower on the site. This tower fell across the guy wires for the adjacent KTVZ tower, bending the top section 10 degrees. And, the falling guy wires for the government tower landed on the main power line feeding the site, cutting off power to the other stations.

Ironically, the KTVZ tower was protected from collapse because it was reinforced at a critical point. The object reinforcing their tower: KQAK-FM's transmitting antenna.

• If you hear Vatican Radio on 1260 kHz AM, the signal isn't coming all the way from

Rome. The *Quincy Patriot Ledger* reports the Archdiocese of Boston is sponsoring a 55-minute program on religious station WEZE. (Thanks, Bob Fraser, for the item)

• TV stations WCCO and KLGT in Minneapolis are experimenting with an interesting two-channel late newscast. An Associated Press item forwarded by Kevin Klein explains how CBS station WCCO and WB Network affiliate KLGT cooperate to produce the unique program.

Both stations open with a simulcast of the day's headlines. Then, WCCO goes to world news and complete weather, while KLGT runs a short weather summary and local news. While WCCO airs sports, KLGT runs health and lifestyle stories. Finally, the stations "merge" again to simulcast a wrap-up. Viewers are encouraged to switch between channel 4 and channel 23, to get the stories that interest them.

The programming on both channels is produced by WCCO, which pays KLGT for their airtime and allows channel 23 to sell one minute of commercial time on both stations. In the ratings, the WCCO part received 28% of the viewing audience, while the KLGT part received 5%, quite good for a small UHF station.

### SKIPPING IN

*John Dunn of Massachusetts passed along some of his "on the road" AM catches. First, from Surf City, New Jersey*

WLW-700	Cincinnati, Ohio
(11am local time!)	
WLAD-800	Danbury, Conn.
WYUS-930	Milford, Del.
WUST-1120	Washington, D.C.
WADK-1540	Newport, R.I.

*And then, DXing from Newport, R.I.:*

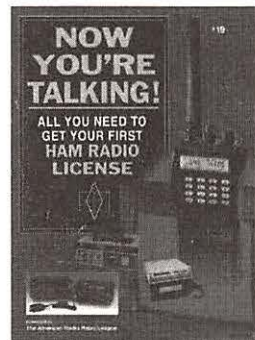
WIBG-1020	Ocean City, N.J.
WWRV-1330	New York
(relayed by RVC-532 in the Caribbean)	
WOND-1400	Pleasantville, N.J.
WFGP-1450	Atlantic City, N.J.

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# Another Brilliant Idea from Washington ...

**J**ust when you think that you have heard just about every hairbrained idea that our elected officials could come up with, another brainstorm looms on the horizon.

The latest money-saving proposal—which looks very likely to pass—is the downsizing and, for all practical purposes, the breakup of the Federal Communications Commission.

The latest proposal is to “downsize and streamline” our FCC offices. To begin with, the monitoring stations will be closed and be remotely controlled from Laurel, Maryland, or Washington, DC.

Take, for example, the monitoring station at Vero Beach, FL—the showcase of the entire network. With the encroachment of civilization on the station at Fort Lauderdale, FL, the entire monitoring station had been moved to a site west of Vero Beach. This location is approximately one hundred miles north of the old Ft. Lauderdale site.

This monitoring station has the latest in monitoring facilities. The radios are the latest Racals. The direction-finding equipment is the state-of-the-art. With the exception of the microwave frequencies, the station monitored the spectrum from below 100 kilohertz to approximately 1000 MHz. It was instrumental in the monitoring of the “radio wars” coming out of Cuba. It also provided direction-finding for ships and aircraft in the Caribbean.

The Vero Beach station had a mobile monitoring van and an “MADF” car (shorthand for Mobile Automatic Direction Finding). The mobile monitoring van was disassembled several years ago and given to the local school district. Now the MADF car will disappear from the monitoring station as well.

The Miami field office will close. The personnel at the Vero Beach monitoring station will have several options. Some will take early retirement. Some will just leave and go into other lines of work. A few will be transferred to Tampa—which will be the only manned office south of ... wherever.



*Assuming the proposal gutting the FCC passes in Congress, all monitoring stations, such as this one in Powder Springs, GA, will be closed and/or automated. Photo by Bob Grove.*

It is still to be decided if monitoring will be done from the Tampa field office. If the EIC (Engineer In Charge) does not want any monitoring, there will not be any. There will be no broadcast station inspections. There will be no aircraft or ship inspections.

If you have an interference problem on your local two way system—too bad. Some moron is locking up the local trunking system? Tough. You say the police cars and fire trucks cannot communicate with each other because someone is playing broadcaster on the local public safety system? Sorry.

The few remaining field offices will be for interacting with the public. This translates into “handing out forms.” The only enforcement left will be to aircraft in flight and Presidential communications. It looks to me as though any enforcement beyond that will revert to the Old West.

The massive direction-finding antennas at the monitoring stations will be removed. That’s too bad—they worked. They will be replaced with an interferometer system which is still under development at the Engineering and Research Section of the FCC. This new system will be remoted over phone lines back to Laurel or Washington.

Such is the scenario for Florida. It will be the much same for the other stations through the country, as well as Puerto Rico, Alaska, and Hawaii. Did you note that what is left of the physical facilities will be totally unmanned? The local vandals and scrap copper

dealers might be interested in that piece of information. Also, how they deal with lightning strikes will be interesting to see.

What brought all of this about? It is the end result of a gradual transition. The current FCC is composed of bureaucrats—political appointments. The people occupying the FCC seats of power have never been involved with the monitoring or signals intelligence functions of the monitoring stations, unlike previous administrators. These folks are lawyers, not former intelligence people or electronics technicians. I am not saying that lawyers don’t have their place, but the positions they now hold started the breakup of

the FCC. The current head of the FCC proposed, immediately after his appointment, that the FCC be totally disbanded and the pieces “scattered to the wind.”

Bottom line: in my opinion, if this happens it will return broadcasting back to the turn of the century when we had no monitoring and enforcement. The pirates will have a field day. After all, who will stop them—the FCC? They don’t, or won’t, exist anymore.

The people at the FCC who have an understanding of what is happening are hoping this will not come to pass during the Clinton Administration. If a new administration occupies the White House in 1996, the above might well go through. If you agree with this writer that this is one of the dumbest moves in recent radio history, then I suggest it’s time for getting in touch with our elected representatives and anyone else we can get to listen.

Now let’s turn to some of the federal systems reported during the past few months.

### ■ Drug Enforcement and Related Operations

The Drug Enforcement Administration has been with us since the mid-1970’s. As an agency of the Department of Justice, it is empowered with the enforcement of the drug laws of the United States. The UHF system used by DEA has been reported before, but here’s a new look.

## The DEA UHF System

Chan	Freq	Use
01	416.050	C/M (CONTROL/ MOBILES)
	418.625	REPEATER OUTPUT
02	416.325	C/M
	418.900	RPTR OUT
03	418.750	SIMPLEX CAR-TO-CAR
04	418.675	SIMPLEX CAR-TO-CAR
05	415.600	C/M
	418.825	RPTR OUT
06	416.200	C/M
	418.950	RPTR OUT
07	417.025	C/M
	418.975	RPTR OUT
08	418.975	SIMPLEX CAR-TO-CAR
09	413.975	C/M
	417.750	RPTR OUT
10	417.750	SIMPLEX

All of the above use a subaudible tone of 156.7 Hz (PL code 5A)

The DEA now has two other radio systems that have not been reported before. One is for local operations and the other is for HIDTA Projects (High Intensity Drug Traffic Area)

## DEA Local Operations System

Chan	Freq	Use
01	416.375	C/M
	418.775	RPTR OUT
02	417.400	C/M
	419.000	RPTR OUT
03	414.600	C/M
	419.200	RPTR OUT
04	413.975	C/M
	419.225	RPTR OUT
05	411.125	C/M
	419.250	RPTR OUT
06	414.425	C/M
	419.275	RPTR OUT
07	414.525	C/M
	419.300	RPTR OUT

## DEA HIDTA Project

Chan	Freq	Use
01	412.525	C/M
	414.550	RPTR OUT
02	419.425	C/M
	414.500	RPTR OUT
03	414.025	SIMPLEX
04	414.050	SIMPLEX
05	414.150	SIMPLEX
06	417.125	C/M
	414.350	RPTR OUT
07	419.325	C/M
	414.350	RPTR OUT
08	419.375	C/M
	414.450	RPTR OUT
09	419.400	C/M
	414.475	RPTR OUT
10	417.125	C/M
	412.125	RPTR OUT

All Subaudible tones are 156.7 Hz (PL 5A).

While we are talking about drug enforcement, the Federal Bureau of Investigation (FBI) also has their Organized Crime and Drug Enforcement Task Force (OCDETF). The FBI radios have the associated radio channels in the "D-Zone" of their radios. They are:

## Federal Bureau of Investigation

Chan	Freq	Use
D1	168.8625	C/M--OCDETF NATIONAL RPTR
	164.5500	RPTR OUT
D2	164.5500	SIMPLEX
D3	166.4625	TREASURY COMMON
D4	167.5625	FBI COMMON NATION-WIDE
D5	167.5375	SPECIAL CASE SIMPLEX
D6	163.8625	C/M--SPECIAL CASE RPTR
	167.5375	RPTR OUT
D7	167.100	DEPT OF ENERGY COMMON
D8	155.475	LAW ENFORCEMENT SIMPLEX

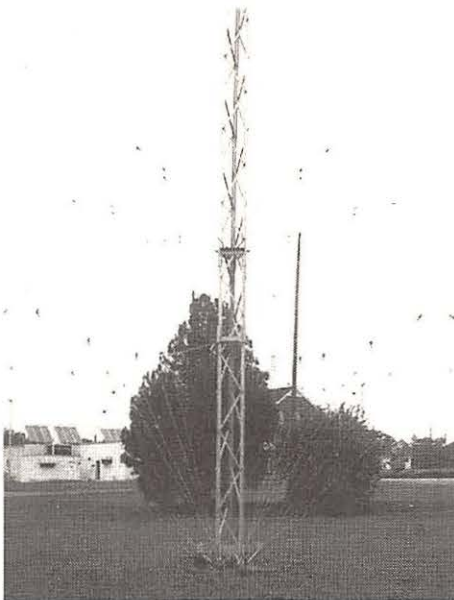
The FBI PL tones are 167.9 Hz (6Z)

Let's go down to the water for some scanning. The Coast Guard Security Service has been reported on the following:

## Coast Guard

Chan	Freq
01	415.925
02	416.850
03	417.125
04	419.925
05	415.625
06	409.825
07	419.125

All of the above are simplex.



Antenna at FCC site, Powder Springs, Ga.  
Photo by Bob Grove

The United States Navy has its own criminal investigators. They are called the Naval Investigative Service. Their channel layout is:

## US Navy

Chan	Freq	Use
01	140.775	C/M
	140.075	RPTR OUT
02	140.775	SIMPLEX
03	140.075	SIMPLEX
04	139.525	SIMPLEX
05	140.650	SIMPLEX
06	140.675	SIMPLEX
07	138.650	SIMPLEX
08	140.025	SIMPLEX

The Subaudible tones are:

127.3 Hz (3A)  
141.4 Hz (4A)  
173.8 Hz (6A)  
192.8 Hz (7A)

Well, that's it for this month. Let's all write our Congressmen (and Congresswomen) and stop the breakup of the FCC. Remember what happened when they gave away 11 meters for Citizen's Band. 73, John, WA4VPY

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# Fueling Up the World

In spite of wars, recessions, and the other problems around the globe, oil is still keeping the world's economies going. Think about it: oil is an extremely important commodity to virtually every individual person in the developed world. As we move through our daily lives there is almost no product or service we use which doesn't depend on oil.

Those of us who live in the North may use oil to keep our houses warm. Our cars require gasoline to take us on our rounds. Our food is brought to us in trucks fueled by diesel oil; bunker oil is commonly used by ships which carry innumerable commodities around the world.

With all this dependence on oil is it any wonder that the petroleum industry is as big, wealthy, and powerful as it is?

Moving all that oil around the world takes a vast fleet of ships which are, in many cases, owned by the oil companies themselves and which use subsidiaries of the oil companies to operate them and communicate with them.

### Standard Oil of New Jersey

A typical example is Standard Oil; Exxon Communications carries out a wide variety of communications activities in addition to communicating with ships belonging to its parent company.

The following list of stations are the limited coast stations owned by Exxon Communications. WHX 790 in Cranston, NY, uses CW and either RTTY or fax on its frequencies, except for 4146 kHz which is SSB. The remainder of the stations use SSB.

2.065	Houston,	TWDS
2.182	Houston, TX	WDS
4.125	Avalon, FL	KZV698
4.146	Cranston, NY	WHX790
4.146	Fort Pierce	WHX614
4.760	Cranston, NY	WHX790
5.760	Cranston, NY	WHX790
6.224	Avalon	KZV698
6.224	Cranston, NY	KGA412
6.224	Fort Pierce	WHX614
6.224	Houston, TX	WDS
7.370	Cranston, NY	WHX790
8.294	Cranston, MA	KGA412
8.294	Houston, TX	WDS
8.294	Avalon, FL	KZV698
12.353	Houston, TX	WDS
12.359	Fort Pierce	WHX614
16.528	Fort Pierce	WHX614
16.528	Houston, TX	WDS

Among the Standard subsidiaries which move the oil from place to place are the various Esso shipping and transportation companies. Most of the tankers are recognizable by the word "Esso" in their name.

The list of ships includes a variety of tankers from supertankers to bunkering tenders. Keep in mind that the lengths given are in meters and that the tonnage is gross register tonnage (grt), which is a measure of the ship's size. Tonnage in this case refers to a measure of 100 cubic feet of enclosed space.

### Esso International Shipping (Bahamas) Co. Ltd.

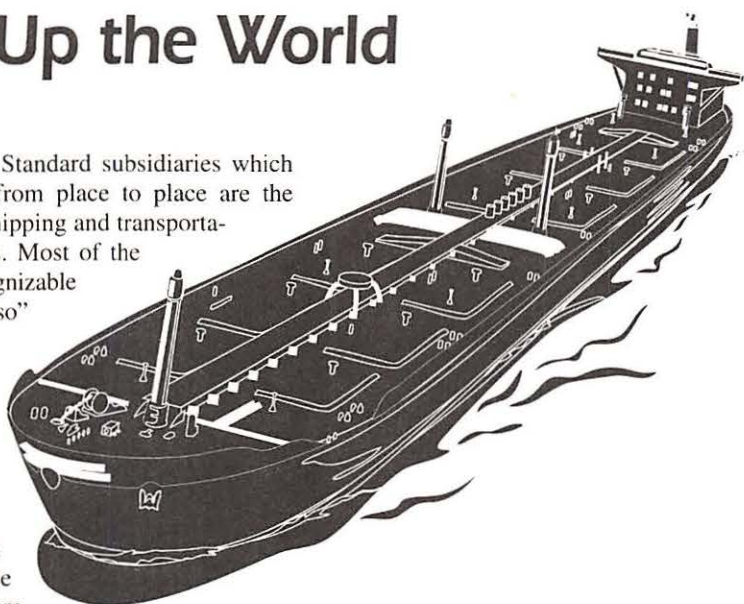
Esso Africa	C6WD	48.8 m.	133969 grt
Esso Bayway	C6HH6	96.5	31677
Esso Demetia	ZCAB2	340.5	133375
Esso Geneva	C6WA	340	149608
Esso Hawaii	C6WE	342.9	139150
Esso Honolulu	6WP	342.9	139150
Esso Kaohsiung	C6FN	245.4	54537
Esso Kawasaki	C6WH	340	149608
Esso Mexico	C6H14	245.4	54563
Esso Nassau	C6FL	245.4	54537
Esso Palm Beach	C6HH8	196.5	31677
Esso Westernport	C6WU	255.5	57830

### Esso Marine U.K. Ltd.

Esso Aberdeen	QZOQ	270.5	58394
Esso Avon	GCCV	91.3	1599
Esso Clyde	GQAD	165.5	11897
Esso Fawley	GWFU	162.7	10631
Esso Fife	GJPS	284.8	75536
Esso Inverness	OPY	91.4	2144
Esso Mersey	GPYU	166.5	11896
Esso Milford Haven	GWFH	162.7	10631
Esso Penzance	GOPX	91.4	2144
Esso Severn	GUHG	166.5	11897
Esso Tenby	GOPW	91.3	2144
Esso Tyne	MMTQ3	161.2	13340

### Esso Norge A/S

Esso Bergen	LMCG	73.1	499
Esso Harstad	LIMA	54.1	471
Esso Slagen	LAWM	162.7	9762
Esso Valloy	LATT	73.2	528



### Esso S.A. Petrolera Argentina

Esso Bahia Blanca	ELOO9	161.2	12806
Esso Formosa	ELOP2	92.7	1944
Esso Rio Grande	ELOP4	155	11503
Esso Rio Negra	LOP5	191.5	19568
Esso San Lorenzo	ELOP7	92.7	1944
Esso San Sebastian	ELOP8	191.6	21619
Esso Santa Cruz	ELOP6	191.6	21619

### Esso Senpaku K.K.

Esso Hidaka Maru	JG4174	81.8	995
Esso Yoshino Maru	JG4393	86.4	1360

### Esso Singapore Private Ltd., Transportation Dept.

Esso Coral Gables	9VBK	191.5	19568
Esso Jurong	9VFX	07.1	3266
Esso Melbourne	S6AM	171	17829
Esso Orient	9VGG	272	50235
Esso Tees	9VGT	70.1	12975

### Esso Soc. Anon. Francaise

Esso Languedoc	FNIX	347.8	126186
Esso Normandie	FNSI	348.8	137578
Esso Parentis	FNVP	161.2	13544
Esso Picardie	FNSL	348.8	137578
Esso Port Jerome	FNYP	161.2	13544

Not only must the oil companies bring their commodity to market, but they must extract it from the ground. In many cases the oil derricks are offshore and radio is used to

maintain various forms of communication with Exxon offices ashore. The Gulf of Mexico is a place where many oil rigs are found and their communications on the low VHF band can be heard for some considerable distance under the right conditions (shown in figure 1).

From the list it is easy to see that a wide variety of frequencies is used. It is reasonable to assume that on the higher frequencies—those above 1 GHz—the channel may also carry data in addition to voice traffic. The lower frequencies, certainly those in the VHF range, will carry voice traffic relating to the operation of the oil rig.

There are also many other frequencies used by Exxon Communications for various purposes—even experimentation. Since Exxon Communications is the subsidiary which holds the radio licences for stations at various Exxon and Standard Oil installa-

tions, there is a wide variety of business transacted which does not relate to maritime activities. There are ordinary business communications, experimental stations, fire departments at refineries, fixed and mobile station trunking systems, and just about anything one can think of.

For sheer variety in radio communications, it would be hard to beat the frequencies licensed to the oil companies and their wide-ranging business activities.

### ■ Canadian regulations may change

Although the regulations were changed some time ago to require all vessels of twelve meters or greater length (about thirty nine feet) to carry a VHF radio, the Department of Industry (formerly the Department of Communications) did not apply this regulation. The reason? Compulsorily-fitted vessels must have an annual radio inspection to comply

with the various regulations. The department simply does not have the manpower to carry out the inspections on the boats between 39 and 65 feet, in addition to everything above 65 feet.

This matter has been allowed to sit quietly until two new wrinkles popped up this year. The first was the February 27th budget brought in by Canadian Finance Minister Paul Martin. This budget has cut \$900 million from the Industry Canada budget and approximately \$600 million from the Transport Department.

The second wrinkle is a proposed new *Small Vessel Regulations* which reinforces the requirement in the radio regulations for vessels over 12 meters to carry a VHF radio.

Unless further regulatory changes are made, it will remain to be seen how this will be enforced with an even smaller number of radio inspectors available to carry out radio inspections. Additionally, many radios which are approved for use on board voluntarily-fitted vessels will have to be replaced with radios approved for use on compulsorily fitted vessels.

As details unfold I will let you know how this plays out, and also what will happen to the Canadian Coast Guard which is expected to have its role redefined and its size cut down.

### ■ Pictures anyone?

Do you have a favorite photo of a ship which you would like to share with other readers? Perhaps a picture of a coast station? As you know I am always on the lookout for information to share with readers, and pictures are also very welcome. Not being a world traveler, I have to rely on our far-flung readership to provide the "color" for the column.

Until next time, good luck and good listening.

**FIGURE 1**

#### *Frequencies used by oil rigs in the Gulf of Mexico*

33.3600	KYL347	158.3700	KXH899	1945.0000	WJX85
33.3600	KGD249	158.3700	KXU490	1955.0000	WED555
33.3600	KIY408	158.3700	WNBZ395	1955.0000	WJX85
33.3600	KUW874	158.3700	WZW868	1960.0000	WNT474
33.3600	KVJ545	158.3700	KBN654	1965.0000	WEH831
33.3600	KXP923	158.3700	KDE521	1965.0000	WJX87
33.3600	WXP217	158.3700	KFZ321	1970.0000	WNT472
33.3600	WZV469	158.3700	KNCS459	1975.0000	WED555
33.3600	KEP215	158.3700	KRS480	1985.0000	WHC857
33.3600	KNIZ763	158.3700	KTF708	2132.4000	WCE305
33.3600	KXD504	158.3700	KTF713	2132.4000	WJX85
33.3600	KXH899	158.3700	KUW873	2134.8000	WCE956
33.3600	KXU490	158.3700	WNRE639	2134.8000	WEE621
33.3600	WNBX358	158.3700	WNVU434	2136.4000	WCE305
33.3600	WNBZ395	158.3700	WNYI406	2138.0000	WCE956
33.3600	WZW868	158.3700	WQX817	2138.8000	WGX744
33.3600	KFZ321	158.3700	WZV470	2140.4000	WBB720
33.3600	KNCS459	158.3700	WZV471	2141.2000	WJX87
33.3600	KRS480	158.3700	KNEJ792	2142.0000	WEE621
33.3600	KTF708	158.3700	WNDD887	2143.6000	WNEE857
33.3600	KTF713	158.3700	WNRE640	2146.0000	WJX83
33.3600	KUW873	158.3700	WNRE641	2147.6000	WEV70
33.3600	WNVU434	158.3700	WXL919	2180.8000	WEF372
33.3600	WNYI406	928.018750	WNEY732	2181.6000	WEV79
33.3600	WZV470	928.256250	WNT773	2182.4000	WEH832
33.3600	WZV471	952.018750	WNEY732	2182.4000	WGX710
33.3600	KNEJ792	952.256250	WNT773	2182.4000	WGX851
33.3600	WXL919	953.2500	WGX851	2182.4000	WSW89
48.8600	KNAG659	953.8500	WEV69	2184.8000	WCE955
158.3700	KYL347	956.8500	WNTS641	2184.8000	WEV79
158.3700	KGD249	1860.0000	WNT473	2186.4000	WEV69
158.3700	KIY408	1875.0000	WEH832	2188.0000	WED555
158.3700	KUW874	1885.0000	WEH830	2188.8000	WCE955
158.3700	KVJ545	1885.0000	WSW89	2190.4000	WSW89
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158.3700	WXP217	1935.0000	WED555	2191.2000	WEE589
158.3700	WZV469	1935.0000	WEH831	2192.0000	WEV69
158.3700	KEP215	1935.0000	WJX85	2196.0000	WGY572
158.3700	KNIZ763	1935.0000	WSW89	2197.6000	WEV69
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## TVRO Shopping via Satellite

**A**t first it seems like a perfect idea. The best way to sell satellite TV equipment is on satellite TV. It's a ready-made market. Of course, the big problem is that in order to buy such gear you have to have a satellite TV system to see it. A second problem is location: where in the Clarke Belt, out of the hundreds of possible transponders, should you locate? And further, how will you get viewers to tune in? For these and other reasons success has eluded many galactic entrepreneurs.

Still, there have been success stories. Probably the most successful of these is "Shop At Home." For at least six or seven years this Knoxville, TN, based company has garnered a loyal and expanding viewership which has seen the channel prosper. From humble beginnings in a small, failing shopping center in rural Kingsport, TN, the company now maintains two full-time and one part-time transponder, selling everything from collectible sports cards to computers and software. They still feature several hours per week of satellite TV gear—everything from receivers to actuator motors.

### ■ Into the Past

The real heyday of the TVRO channels was in the mid to late '80s with Shawn Kenney's "Greensheet" and Doug Dehnert's "Sky Store." On "Greensheet," viewers were treated to a steady parade of new, used, old, disabled, and junk satellite TV equipment. There's not been a show like it since.

In between sales pitches, Kenney would harangue viewers about the pending specter of scrambling, the need for a grass-roots TVRO organization to fight the monster which was General Instrument Corp. He launched a steady campaign against the dawning of the VideoCipher era with his program segment called "Yellow Rain" in which he flirted with the growing VCII "hacker" underground.



One of four regular satellite TV shopping channels, Skyvision hawks its wares on Telstar 302 chan 21.

His antics kept him in constant legal battles with industry powers. Some viewers publicly complained about his business practices; others rallied around him. His untimely death resulting from a fall from the roof of his home during repairs put an end to the legend.

Against Shawn Kenney's used-car salesman image was Doug Dehnert, whose soft-spoken, common-sense lectures on satellite technology made regulars out of many viewers. Even if you had no interest in buying any of his TVRO gear it was an educational opportunity.

Dehnert was a boot strap engineer. While building and racing snowmobiles in the desolate northwest corner of Minnesota, Dehnert was quick to see the potential of satellite television. It wasn't long before he was building his own satellite systems complete with his own fiberglass dishes and quality receivers.

While most of his business was commercial, he tapped into the residential market with his weekly program "Sky Store." Here he sold his receivers under the Maspro brand and his dishes under the United Satellite Systems brand. He sold New Old Stock (NOS) equipment cheaply—good used equipment which had been checked by his technicians and in general added a touch of honesty to an industry plagued by bad reputations.

Even his close association with Bob Cooper, early TVRO pioneer and one of the first to break the VideoCipher encryption system, failed to tarnish his reputation. Still, there wasn't enough response to the "Sky Store" and it left the Clarke Belt in late 1991. Dehnert's United Satellite Systems continues with its commercial operation today.

### ■ New Generation Hucksters

1994 was the best year for satellite television in nearly ten years. During the past year C-band satellite TV systems were being set up in American yards at the rate of more than 55,000 per month. This means that with each passing month another 55,000 potential viewers will tune into a channel featuring satellite TV gear. No wonder "Shop At Home" is doing so well!

Several new TVRO-oriented shopping shows have shown up in the last few years and they're different from the earlier ones. Unfortunately, none of them sell used equipment. Throughout this country there are thousands of working, good-condition receivers, LNBs, actuator arms, and peripheral gear—more than enough to stock a good sized warehouse—and it's going unsold. The new shows sell the high-end gear. They sell program packages; some are even selling the new DSS systems for DirecTV and USSB.

Smartly dressed young men and women pitch these wares the same as they would CD players or cosmetics. There's no politics, no education, no harangue! Well, almost none. The folks at Satellite City are about as obnoxious as salesmen can get, but it must be

### TVRO Shopping Programs

Satellite City T302,2,3,7 T301,2 G3,20  
Satellite Market U.S.A. G3,9  
Shop At Home G3,17 S3,18, G1,14  
Skyvision T2,21, F2,8

working. Transponder time, 800 telephone numbers, staff, and warehouses aren't cheap. They're on no fewer than five different part-time channels hawking their "Super Ice" LNBs in a voice only a barker could love. The folks at Satellite Market U.S.A. aren't too far behind. They are a slightly toned-down version of Satellite City.

### ■ Window Shopping

If you're interested in upgrading your existing equipment, it's probably a good idea to watch these channels and compare prices. But, before you buy, check out the mail order companies for the same models and call the local dealers in your area. You might find a local dealer willing to meet the advertised price of the gear you want and you could save the shipping and handling. You might also find it easier to be serviced locally.

### ■ Space News

The Russian satellite RS-15 is the latest in the popular RS series of Russian amateur satellites and was launched successfully late last year. It is said to be in a very high, low earth orbit at about 1,250 miles, and it takes a little over two hours to complete one orbit. This altitude means it should be "visible" to antennas for longer periods and from greater distances. The DX opportunities of this new satellite have many satellite amateurs excited.

The satellite has one Mode "A" transponder using the standard 2 meter uplink (145.858-145.898 MHz) and 10 meter downlink (29.354-29.394 MHz). SWLers many want to try to monitor this new bird by tuning the two on-board beacons at 29.352.5 and 29.398.7 MHz. As I write this, I'm listening to a number of CW QSOs on the bird, and the signals appear strong. You'll know you're listening to a satellite when the signals experience the Doppler shift and you have to adjust your tuning to keep up with them.

### ■ Digital Audio Radio Services

The FCC has taken the first steps toward establishing satellite-delivered radio broadcasting known as the Digital Audio Radio Services (DARS). The services will use 50 MHz between 2310-2360 MHz as set out in the last World Administrative Radio Conference (WARC '92).

Using digital compression systems similar to those now used for digital cable audio services, these new services would provide compact disc quality audio to subscribers in fixed or possibly even mobile locations. The impact on the existing terrestrial radio broad-

cast industry means that there will be lots of jockeying for financial stakes in this newest satellite "golden goose." I look for existing radio giants to leap in and gobble up the bulk of what will be offered.

### MAILBAG

• Greg Gilbert of Marietta, GA, writes to ask many questions about INMARSAT, WXSAT, and SCPC signals. Basically, he would like to use a small dish system to receive all three types of signals. He included an advertisement of a popular 3' Ku band portable satellite system.

Well, Greg, the system in the ad is designed solely for Ku band use. This means that the components—the receiver, feed horn, and LNB—are all designed to receive signals in the 11-12 GHz range. However, it would be a simple enough task to remove the LNB and replace it with an INMARSAT feed and feed that into an appropriate receiver capable of receiving such frequencies.

The drawback is that you'll end up running outside all the time switching feed horns, and it won't be long before you've decided to put up another dish.

WXSAT signals are found on two different frequency sets. 1691 MHz is for the GOES geosynchronous satellites and 137-138 MHz is for the polar orbiting weather satellites. For polar orbiters a simple "turnstile" antenna can be made to good effect. A feed for the 1691 can be homebrewed from a coffee can and, again, fed to the appropriate receiver.

SCPC signals are found mostly in the C-band range (3-4 GHz) and will require yet another feed and appropriate receiver. In addition, the 3' Ku antenna will be a little too small to give satisfactory results.

The upshot, Greg, is that in order to satisfy your diverse and, apparently growing, monitoring appetite, you'll need no fewer than four separate antennas! But, before you get depressed, you should start building your satellite library. In your case I recommend the *Weather Satellite Handbook* by Dr. Ralph Taggart (published by ARRL and sold in the Grove catalog as BOK 56) as the place to start. Here you'll learn how to make your own INMARSAT/WXSAT feed, build a turnstile antenna out of PVC plumbing parts and much more.

For SCPC information buy Tom Harrington's *Tune To Satellite Radio On Your Satellite System* (Also available from Grove as BOK 84). For \$36 and a week with these two books, you'll be an expert on both!

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# Who's On The Band?

**F**ew places in the radio spectrum offer the variety of signals found on longwave. From ships at sea, to navigation beacons, to broadcast stations—you can hear them all on LF. For the newcomer, discovering all of these signals can be a real challenge. Even for the seasoned longwave buff, keeping track of “what transmits where” can be a chore. This month we’ll take a brief tour of the band and identify some of the major players that can be heard.

Our tour should actually begin just a bit higher than the top end, at 518 kHz. This is where the **NAVTEX** system operates. NAVTEX is an internationally standardized method of sending marine information to boats equipped with low cost teleprinting equipment. NAVTEX capability is now *required* for large vessels as part of the Safety of Life at Sea (SOLAS) convention, as amended in 1988.

Besides a computer, all you’ll need to monitor NAVTEX is a terminal unit capable of decoding SITOR Mode B. (Attention Hams: Any terminal unit that will receive AMTOR Mode B can also be used to tune into NAVTEX.) For best results you should try for NAVTEX signals after sundown.

There are also a small number of beacons operating above 500 kHz. Some commonly logged stations are: YWA (516 kHz) Petawawa, ONT; JJH (523 kHz) Jamestown, NY; HEH (524 kHz) Newark, OH; and ZLS (526 kHz) Stella Maris, Bahamas. Many longwave fans got their start hearing some of these beacons at the low end of their AM car radio. More on beacons in just a moment.

**500 kHz** is the former maritime Distress and Calling Frequency. Even though the Coast Guard discontinued its watch here in August of 1993, there is still sporadic activity to be heard. Maritime transmissions are sent in keyed-carrier CW, so you’ll need to turn your BFO on to hear them properly.

From 500 kHz down to roughly 435 kHz, you’ll hear a fair amount of **maritime CW** traffic. The strongest signals come from coastal stations, but you’ll also hear ocean-going ships from time to time, especially if you live near coastal waters. Some frequencies that are active at this writing include: 434, 436, 476, 478, and 484 kHz.

From 435 down to 190 kHz you’ll find the flagship tenants of the longwave band—**Navigation Beacons**. These stations are used by aviators and mariners for direction-finding purposes and can be thought of as electronic lighthouses. You’ve probably heard their

repetitive 2 or 3 character Morse signals while tuning across the band. The majority of beacons in the U.S. are run by the FAA, but some are also operated by private airports, the Coast Guard, and the U.S. Army. Beacons typically run just 25 watts of power, but can be copied hundreds of miles away under the right conditions. There are also some notable exceptions to the power norm. For example, TUK (194 kHz) in Nantucket, MA, runs a hefty 4000 watts. At night its signal can be clearly heard throughout the Eastern U.S.

repetitive 2 or 3 character Morse signals while tuning across the band.

For many listeners, DXing beacons is the entire focus of the longwave hobby. After all, it’s quite a thrill to snare a low-powered station from 10 times its intended range. Some DXers have compiled lists of hundreds of beacons heard.

The satellite-based GPS system has lessened the importance of beacons for navigation, but don’t count them out just yet. They remain a solid backup to the fancier (and far more expensive) systems, and are still an important tool for many private pilots and small boaters.

By the way, if you’re going to be chasing beacons, it’s much more fun if you can readily identify what you’re hearing. The *Aero/Marine Beacon Guide* gives you location infor-

mation and useful DXing tips for over 7000 beacons, GWEN stations, and Lowfers. You can order it direct from the publisher: Mr. Ken Stryker, 2856-G West Touhy Avenue, Chicago, IL 60645. The price for the *Guide* is \$15.00 postpaid in the U.S.

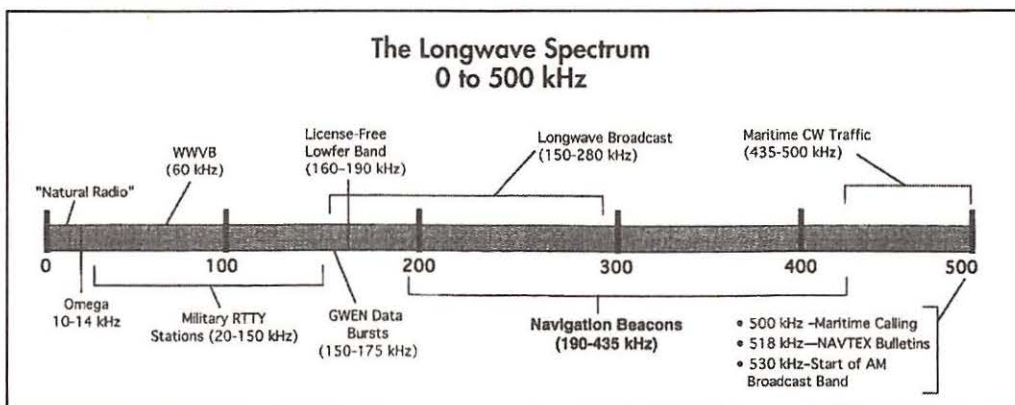
In Europe and many parts of the world, 150 to 280 kHz is a **broadcast band**. Many of the stations here run well over one million watts of power, and can be heard in the Eastern U.S. when conditions are right.

For stateside reception, the best times to listen are from dusk till about 11 pm (the approximate times that a path of darkness exists between the U.S. and Europe). Some kingpins to listen for are: BBC (198 kHz), France (162 kHz), Radio Luxembourg (234 kHz), and Radio Monte Carlo (216 kHz).

Because broadcasters share the band with beacons, you’ll occasionally hear the two services “dueling.” One of my most memorable intercepts was hearing beacon DIW (198 kHz) while also hearing the results of a cricket match on BBC longwave!

From 160 to 190 kHz the FCC permits unlicensed operation under the following conditions: (1) No more than one watt of input power may be used, and (2) The antenna length must not exceed 50 feet (including the feedline). Sounds like tough odds, but a growing group of experimenters known as “**Lowfers**” are having great success making contacts with homebrew gear. Sometimes contacts are made over paths exceeding 300 miles.

To hear a Lowfer you’ll need a low-noise antenna (such as a loop or active antenna), a

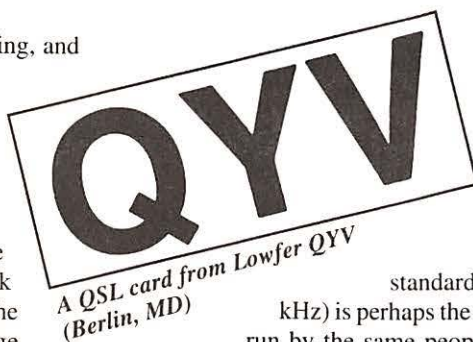


Profile of the longwaves

narrow bandwidth setting, and lots of patience. The reward for digging out these signals is that almost all Lowfers are avid QSLers.

The Ground Wave Emergency Network (GWEN) dominates the 150 to 175 kHz range. These stations are part of a nuclear-hardened network operated by the U.S. Air Force. GWEN signals sound like short, raspy bursts of noise, but they are actually heavily encrypted data packets. There are GWEN sites scattered all over the country, so your chances of hearing at least three or four from your location are good.

The band begins to change rapidly below 150 kHz. Down here, you won't find any voice signals. Between 150 and 20 kHz there are an assortment of **military RTTY** stations with encrypted signals. The main advantage of operating on these frequencies is propagation reliability—something crucial to military operations. Around-the-clock long



A QSL card from Lowfer QYV (Berlin, MD)

distance communications are usually possible regardless of disturbances on the shortwave bands.

Also in this low range are several time and frequency

standard stations. WWVB (60 kHz) is perhaps the best known. WWVB is run by the same people (and from the same site) as its HF cousin, WWV in Fort Collins, CO.

Between 10 and 14 kHz is home to the lowest frequency service that most people will ever hear—**OMEGA**. The OMEGA system consists of eight transmitters around the world and is used for radiolocation. By comparing the timing differences between several sites, a pilot or mariner can determine his position with close accuracy. In the 1960s OMEGA was considered state-of-the-art, but today it's destined to become a backup to GPS.

Below 10 kHz is generally considered to be the territory of "**Natural Radio**"—that is, signals which are emanated by the Earth itself, or by the atmosphere. "Whistlers," "Tweaks,"

and "Dawn Chorus" are all examples of natural radio sounds. There are also studies underway to determine if some of the signals heard here may be precursors to seismic events.

There you have it—an abbreviated tour of the longwave band. Consider this your invitation to tune down under!

## ■ FLEA MARKET FEVER

One of the largest radio meets in the Northeast U.S. is the Rochester, NY, Hamfest (May 19-21). Being from the Rochester area, I may be somewhat biased, but I think this fest has some of the best longwave goodies around. If you're planning to attend, I'd enjoy meeting you in person. Just give me a call (WB2QMY) on 146.58 MHz between 10 and 11 a.m. on Saturday, and I'll direct you to my flea market location.

Speaking of Flea Market goodies, I'm searching for a 74C929 or a 1M6508 chip that is needed to complete the CW keyer for my 185.00 kHz Lowfer station. If you know of a source for either of these discontinued parts, please drop me a line here at MT.

That wraps it up for this month. See you in June.

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## New Products and Services

**A** *Amateur Radio Newline* is a weekly news service available free via telephone or recorded audio tape. The service sounds a lot like CBS's news on the hour—and for good reason. The people who prepare *Newline* are all professionals in the news media who contribute their time and production skills. *Newline* is provided free of charge and is funded by voluntary donations from individual amateurs and clubs. They are not associated with any other organization.

The intent of this service is to provide the ham with latest up-to-the-minute information of happenings within the hobby. *Newline* is formatted to be rebroadcast via FM/SSB by bulletin stations.

In addition, *Newline* has an "Instant Update Service" to provide rapid distribution of major events involving ham radio. This instant update service is available by telephone only at (805)-296-2407.

These phone numbers provide *Newline* in the following areas: Chicago (708)-289-0423, Dayton (513)-275-9991, Los Angeles (213)-462-0008 and (805)-296-2407, Louisville (502)-894-8559, Melbourne, FL (407)-259-4479, Seattle (206)-368-3969 and (206)-281-8455, Tacoma (206)-927-7373, and West Palm Beach (407)-798-5098. Even though these phone locations are unfunded, there is no charge for their use!

You can also obtain *Newline* via audio cassette at a charge of one dollar for postage and handling (\$1.50 overseas). To obtain the tape service contact the *Newline* at (805) 296-7180, or MCI mail at 324-1437, e-mail via genie:b.pasternak.

If you are a bulletin station, this professionally-produced service can do a lot to spice up your weekly transmissions on the local repeater; give it a try!

### ■ Want to get your license?

While at the Orlando Hamcation, I came across a great program for the No Code Technician License. The **No Code License Study Program** is available for PC users at the incredible price of \$19.95 plus shipping and handling (add 5 bucks and it is still a bargain). The program includes both 3-1/2 and 5-1/4 inch disks, will run with only 384k of ram, and with any graphics adapter. In-



Power Pocket

cluded with the software are study guides for Novice and Technician question pools, a graphics work sheet and part 97 of the FCC rules. The software is interactive and provides tests from the question pool for each section. Registered users can get updates of the latest info, as well as a phone number for tech support.

After looking at the software, I would say the average user should be able to breeze through the No Code exam with minimum of studying time. This great software package is available from: EVE Graphic Services, 2003 Lincolnway East, Suite 391, Goshen, IN 46526, or phone (219) 534-2377.

### ■ Buckmaster

Well-known HamCall CD-ROM (call book on a CD) has updated the software to allow printing labels from within the program, and has added a lot of new public domain programs.

Many of these programs alone are worth the \$50.00 price of HamCall. Some that I have found useful include satellite tracking, logging, SWL/scanner data bases, and antenna

design; in addition, the rig modification text files are great!

Buckmaster has introduced a new CD called the **Electronics Software Compendium**. This CD contains over 15,000 files with info on electronics, ham radio, and SWL activity. The new CD has over 200 megs of pc material, including more than 1,000 text files and programs that deal with circuit design/analysis and general electronic information. Price is \$25.00 plus \$5.00 s/h.

Buckmaster also has an online call book service, which is available at a price of \$29.95 per year. The phone call is not free, but many hams will feel the ability to have the latest up-to-date call book information will be well worth the price.

For more information or to order call Buckmaster at (703) 894-7777, or write to them at Route 4, Box 1630, Mineral, VA 23117; they are also available on Internet @buck.com.

### ■ The Power Pocket

Have you ever wanted a reliable, lightweight (easy to carry), battery pack that could be left on charge 24 hours a day, picked up at will, and used for hours on end? Want no more: the **Power Pocket** is here.

For years I have been devising various power packs that could be used for both my HT's and QRP rigs when camping/hiking. While I have been pretty successful, the common problem was having a pack ready on



QRP Plus

instant notice. NCG'S Power Pocket has solved the problem nicely.

Rated at 12 volts 2.0AH/20hr., this lead acid battery can be stored or charged in any position without leaking. It can be left on the charger indefinitely (can't be overcharged), comes in a great-looking, black, canvas case

with belt loop, carrying strap, and convenient auto cigarette-lighter adaptor to accept any connector. Measurements are 3.5 x 1 x 6.5 inches. The unit has a charge retention of 97% after one month and 85% after six months, and will operate under almost any conditions (see fig. 1).

I have made a strap so I can attach any of my HT's to the carry strap. The HT is on the back side of the loop, and a piece of Velcro attaches the mike to the front of the loop for one handy portable system.

In use at my station I have run my HT (5W) for an entire weekend. My scanner has run off the Power Pocket for well over a week without charging, and nightly sessions on CW/SSB with the Argo 509 present no problems at all. When I am done with a session, it is simply a matter of plugging the unit into 115 volts and not worrying about it till I need it again.

The Power Pocket is available at most ham radio stores; list price is \$69.95. For more information or to order write to NCG, 1275 N. Grove St., Anaheim, CA 92806, or phone them at (714) 630-2611.

### ■ QRP Plus

Index Laboratories, 9318 Randall Dr. NW, Gig Harbor, WA 98332 phone (206) 851-5725, have recently announced the **QRP Plus** transceiver at a price of \$595.00. The unit covers all bands, 160 through 10, with variable power output from milliwatts to a full five watts on CW/SSB.

Specs on the QRP Plus are very impressive: a general coverage receiver from 1.8 through 29.7 MHz, 20 memories, split operation, SCAF digital filters that are variable from 100 Hz to 2.4 kHz, SSB, and full break in CW. Its built-in iambic keyer, and small size (5 1/2 x 4 x 6 inches) make this a truly attractive unit for the serious QRP operator (see fig. 2).

That's all for May, gang; see ya next month. 73 de Ike, N3IK

## Rob Leonard's Ham DX Tips

May is an interesting word. It is the name of a month that is the apex of spring in the northern hemisphere, autumn in the southern. It is also an imperfect verb used only as an auxiliary, such as: "May you log some new DX with the aid of this month's tips!" which we hope you do!

**ALBANIA** Thanks to PA0GAM's recent gift of an RTTY converter, ZA1AJ is now active on RTTY. Check 14080 to 14085 kHz at 2200 UTC most days. QSL requests should be sent to his QSL manager, Vit Kuncar, OS1PSZ, Havrice 293, CS-68801 Vhersky Brod, Czech Republic. **ASIATIC RUSSIA** TUVA REGION Members of the Foundation for Amateur International Service and the Friends of Tuva are planning a DXpedition to take place from the capital Kyzyl starting in late May and continuing through June. The operation will include American, European Russian, and local amateurs, and will use a callsign with prefix VA0Y. **CAMBODIA** XU7VK, sometimes using the special callsign XU95HA, has been active on 14022 kHz CW at 0100 UTC. QSL requests should be sent to: HA0HW, Laszlo Szabo, Box 24, H4151 Puspoklandany, Hungary. **CANADA** Roy Blakeburn, VE1XA, writes to tell us that Industry Canada has authorized two special prefixes for use by amateurs in Nova Scotia in the month of June. Amateurs in Dartmouth may use the callsign "CG7D" and amateurs in Halifax the prefix "CG7H" to commemorate the G7 economic conference taking place in Halifax in June. The suffixes of their callsigns will remain the same. **CONTESTS** The 6th and 7th is the *ARI International DX Contest*, all HF bands except the WARC. Starting May 20th at 2300 UTC and ending 4 hours later at 0300 UTC on May 21st, the *ARRL 6 meter Spring Sprint* will take place. Commencing May 27th and 28th, the *CQ Word Wide Prefix CW Contest* will be occurring on all amateur bands from 160 to 10 meters, except the WARC bands. **DX NETS** VA1MV's "Arctic Polar Net" meets every Sunday at 0800 UTC on 14150 kHz SSB. **MAURITANIA** 5T5CJ has been an RTTY regular on 21088 kHz beginning at 1330 UTC most days. His QSL manager is F6FNU, Antone Baldeck, 2. P. 14, F-91291, Arpajon Cadex, France. Antone prefers a self-addressed envelope, and two "green stamps" to cover postage. **ST KITTS** Using V44K, the callsign of the St. Kitts Amateur Radio Club (P.O. Box 827, St. Kitts), is a CW beacon at 50055 kHz. Located at approximately 3,000 ft. on one of the islands' two highest points, the beacon transmits at less than 10 watts. Yet, when conditions are good, reception of this beacon is possible over most of North, Central, and South America (not in all areas at the same time, of course). If you hear V44K, then keep a watch between 50110 kHz SSB/CW and 50125 kHz SSB/CW for brothers Joel Liburd V44KAI, (Ponds Pasture, St. Kitts) and Oliver Liburd V44KAO, both of whom are active on 6 meters. **SAUDI ARABIA** 7Z500 has been found around 28020 kHz CW at 1500 UTC. QSL, with SASE, to: WIAF, the Harvard Wireless Club, 6 Linden St., Harvard University, Cambridge, MA 02138. **SLOVAKIA** May 27th and 28th, a Hamfest will take place in the village of Vrutky in the northeastern part of the country. Organizers plan to have symposiums on construction of homemade equipment, DX, and a flea market/swap meet. Amateurs from neighboring countries are welcome, as are those from other countries who may be traveling in the region at the time. **SOUTH AFRICA** ZS6YA (Etienne Swart, Box 14, Honeydew 2040, South Africa) has been given permission to celebrate the Rugby World Club Games by using the special callsign ZS9RWG. Look for this station on 10 through 40 meters SSB and CW. **TANZANIA** 5H3JD can be found on 28495 kHz to 28500 UTC SSB at 1700 UTC. QSLs should be sent to: DK9MA, P. Raymund Wiedemann, D-86941 St. Ottilien, Germany. **USA** This is the height of the 6 meter DX season, and this editor, N9LAG, will be active from atop Bald Knob Mt. (Grid Square EM-57) during the six meter sprints and can be found on six meters SSB other times when that band is open. QSL requests, with SASE please, should be sent to: P.O. Box 91, Benton, IL 62812. No other addresses, please! Of course, we welcome your comments and any information you may have; send to this column in care of MT. Until next time, 73 de Rob

## Don't Panic...



... if you haven't received your *Monitoring Times* by the beginning of the month. Postal delays do occur, and we must wait until the 10th of the month before sending replacements for lost issues.

Be patient and wait until the 10th; if you still don't have your *MT*, call us at 1-800-438-8155 and we will be happy to send a replacement.

## Pirate Bust Developments

**A**dditional information has surfaced on the FCC's January pirate enforcement actions that we covered last month. Two of the three FCC "visits" were uneventful, and really cannot be classified as busts. But (as reported by the FCC, by John Arthur in *The ACE*, and by other reliable sources contacted by *MT*), John Cruzan of Joplin, MO, was the victim of FCC equipment seizure. Both transmitters and shortwave receivers owned by Cruzan were confiscated as a result of a specific search warrant. No Notice of Apparent Liability has been issued by the FCC in the case, but the seized equipment is now in the possession of the government. Cruzan has thus far made no public comments on the incident.

An unrelated FCC bust took place on February 7 in Lindenhurst, NY, where FCC agents and local police arrested Joseph Caracciolo, alleged operator of FM pirate **WEFX** on 87.9 MHz. Although there had been no complaints of interference from the pirate, enforcement authorities were responding to complaints of equipment theft from licensed stations such as **WGSM** and **WRCN**. For example, police claimed that the WEFX antenna had been stolen from a licensed broadcaster. Judge Armand Araugo of Suffolk County District Court set bail at \$2,500, but Caracciolo initially remained in jail. Thanks go to *MT* readers who sent in a *Newsday* account of this bust, including Herbert (WB2ASA) of NY.

We're still receiving press clippings and information about **Radio Free Berkeley's** court victory over the FCC, which unsuccessfully sought an injunction in Federal Court to prohibit the station's unlicensed broadcasts on FM. Joel Rubin of San Francisco, who saw a *San Francisco Examiner* article that included comments about *Monitoring Times*, points out that at least a half dozen micropirates are active on FM in the Bay Area. He says that Radio Free Berkeley maintains a recorded message number at (510) 464-3041.

FCC activity noticeably reduced the volume of North American shortwave broadcast pirate transmissions during much of the winter. But, as we see in this month's loggings submitted by our readers, there is once again quite a bit of activity on the pirate bands. If you patiently check out the listed 41 or 43 meter frequencies on weekends, you have a good shot at hearing one of these entertaining broadcasters.

### ■ Europirate Information

The *Pirate Chat* Europirate bulletin has been somewhat erratic in its publishing schedule lately, but there are alternative publications. Pecolatto Bruno publishes one of them, called *Pirate News*. It's mainly a list of his own Europirate logs, but many of us on this side of the Atlantic maintain an interest in European operations. If you'd like information on Pecolatto's sheet, send at least \$1.00 US to cover postage. The address is Via Soana, 13 10085 Pont Canavese, Torino, Italy.

Bruno notes regular reception of Radio Dublin on 6915 kHz with a lengthy schedule between 0800-2300 UTC. This station sometimes makes it across to North America, so it is worth checking out.

### ■ Mexican Clandestines?

I still have seen no confirmed loggings of the proposed new clandestine stations **La Voz de Chiapas Libre** or **La Voz de Guatemalan Mayan**. However, maildrop contact Jay Murley (of San Diego, CA 92143-4106) says that he has received five reception reports for operations in the 7400-7500 kHz region. Has any-

body noticed these clandestines, or are they similar to the old **NDXE** that never materialized?

### ■ Jamming Gone

*MT* overseas reader Vitaliy Liberny of Lviv-Rudno, Ukraine, writes in to remind us that reception conditions are much different in Europe since considerable jamming by the former USSR has disappeared. Jammers have always been the ultimate clandestine transmitter, since they attempt to obliterate programming from other countries. Although some jamming survives today on shortwave, especially in the Middle East region, we're all thankful that the days of major Soviet jamming broadcasts are now in the past.

### ■ Taiwan Pirate Update

In response to the controversy over dozens of pirate radio operators, the Taiwan Ministry of Transportation and Communications announced that 46 private sector broadcasters have been given low power transmitting licenses. Nevertheless, heavily political medium wave and FM pirate stations, openly supported by the country's taxi drivers, have continued operations in early 1995. Taiwan Premier Lien Chan has had to discuss the issue at government cabinet meetings. We appreciate Steven Thow of Montreal, Quebec, who forwarded articles from *The Free China Journal* on the controversy.


### ■ Third Anniversary

It seems hard to believe, but this column marks my third anniversary of editing the *MT* Outer Limits coverage of unlicensed broadcasting stations. When Bob Grove asked me to try and fill the shoes of John Santosuosso, I really didn't know what an interesting experience it would be. Many scores of our readers have sent in comments, information, loggings, and speculations. I want to take this opportunity to thank every one of you. I have discovered that *Monitoring Times* is not just a magazine. Instead, we are all friends with a common link through the endlessly fascinating shortwave broadcast bands. Thanks!


### ■ What We Are Hearing

Next month we would love to print your pirate logs here. You can send them in via PO

### Radio Bullfrog




You did something that several federal agencies have yet to do.... **YOU caught BullFrog!**  
 On 12/31/94 Dick Pearce listened  
 at frequency 6965 at 2200 hrs.  
*BullFrog*



*Dick Pearce's interesting QSL from the South.*

David Chapchuk :  
**This QSL card confirms your reception of RADIO ALBATROSS INTERNATIONAL**  
**DATE:** February 5, 1995  
**TIME:** 2101 UTC  
**FREQUENCY:** 15675 kHz  
 via Radio Copan Internacional

**Thank you for listening and reporting your reception 73, Fight For Free Radio!**  
*Pirate Mike*  
**RADIO ALBATROSS INTERNATIONAL**  
 P. O. Box 25302  
 Pittsburgh, PA. 15242 USA



Photograph: "CRYSTAL'S BIRTHDAY" (c) 1993 by Jack Bowman  
 All rights reserved.  
 Used by permission.

Chapchuk's Albatross QSL is only a semi-pirate.

Box 98, Brasstown, NC 28902.

Correspondence maildrop addresses used by pirate stations logged this month include PO Box 452, Wellsville, NY 14895; PO Box 109, Blue Ridge Summit, PA 17214; PO Box 25302, Pittsburgh, PA 15242; PO Box 146, Stoneham, MA 02180; PO Box 28413, Providence, RI 02908; PO Box 17534, Atlanta, GA 30316; 770 Sycamore Avenue #J193, Vista, California 92083; PO Box 293, Merlin, Ontario N0P 1W0; Kammarvagen 13D:220, 226 46 Lund, Sweden; and PO Box 3174, Onekawa, Napier, New Zealand. If you would like a QSL reply to a reception report, three 32¢ stamps are required to USA addresses; \$1 US to foreign drops.

**Anarchy One-** 6955 at 1615. Captain Anarchy's shows are dominated by political discussions. He's not a big supporter of the existing system. Addr: Vista. (Jesse Rose, Hampton, VA)

**Black Rider Radio-** 6965 at 2300. This one always announces a complete playlist for their diverse eclectic music shows. As we see here this month, their QSL's are now arriving. Addr: Wellsville. (Barry Williams, Enterprise, AL; and direct from the station)

**Bullfrog Radio-** 6955 at 2200. Station operator Bullfrog notes that the station's signature tune is "Bullfrog Blues" by Canned Heat. Rob is among the many who have received recent QSLs from this overtly southern broadcaster. Addr: Faribault. (Robert Ross, London, Ontario)

**He Man Radio-** 6955 at 2200. He Man's sexist barbs will never win any awards at a feminist conference, but he's been broadcasting on the pirate bands for over four years now. Addr: Blue Ridge Summit. (Harold Frodge, Midland, MI; Williams; Rose)

**Heavy Dude Radio-** 7417 at 1630. Relays of Europirates in North America have been drastically curtailed after the demise of NAPRS, but Jesse heard this hard rocker on 41 meters. Addr: Lund. (Rose)

**JAZZ-** 7415 at 1715. The format at this new one is obvious from its call letters. Most of the jazz compositions are relatively recent instrumental pieces, and some comedy is mixed in. Addr: Wellsville. (George Zeller, Cleveland, OH)

**K-2000-** 6955 at 0100. **Radio Azteca** may have walked away with the "Best Station" award in the 1995 ACE Pirate Popularity Poll, but many feel that the elaborate DX parodies at K-2000

could be the best shows being broadcast on shortwave today, licensed or not. Addr: Stoneham. (Williams)

**KDED-** 6955 at 0130. The Voice of the Grateful Dead has never been known to play any Tony Bennett music. They prefer Jerry Garcia. Addr: Wellsville. (Williams)

**KIWI-** 7445 at 0645. This Oceania pirate is still being heard with some regularity in the wee hours on some weekend days. Diane and Barry said that they air ads for *The ACE*, but that their signal was weak. Rob's QSL

arrived in only 4 weeks. Addr: Onekawa. (Diane Mauer, Pulaski, WI; Ross; Williams)

**North American Pirate Relay Service-** As announced earlier this year in MT, Dick Pistek has permanently left the air on January 15. But, he offers certificates for 10 stations verified via NAPRS relays in the past, with additional increments of 5, via his drop. Addr: Wellsville. (Chuck Porter, Troy, NY; Frodge; and direct from the station)

**One Voice Radio-** 6955 at 1900. The calm voice of Joe delivers medical tips to promote healthy habits by DXers. This old-timer had not been heard for a while, but if you've tuned in **Ground Level Network**, then you'll recognize the format. Addr: Merlin. (Frodge)

**Radio Airplane-** 6958 at 0015. Captain Eddy produces a mix of rock music and comedy that he relays from an aircraft in flight. A recent show featured a call-in segment with studio guest Mr. Pinhead. William heard a dog barking at sign-off. Addr: Wellsville. (William Hassig, Mt. Prospect, IL; Williams; Rose)

**Radio Albatross International-** 15675 at 2100. Radio Animal and Pirate Mike, who produce this pirate-like program that is relayed on Sundays via **Radio Copan** in Honduras, have announced that they still expect to be on the air by the time that you read this, but at 2000 UTC during the summer. Addr: Pittsburgh, and they obviously verify as we see this month. (David Chapchuk, Scranton, PA; Hassig; Williams)

**Radio Fusion Radio-** 6956 at 2230. Not to be confused with the European **Radio Fusion**, this North American station is dominated by rap music. Synthesized voice announcers, comedy, and parody ads are sometimes noted. Addr: Providence. (Frodge; Rose)

**Radio Is Not Radio-** 6955 at 2200. The various parody stations of **Radio USA** are still with us. This one is supplementing its synthesized computer voice loop with multilingual jingles at times. Addr: Providence. (Williams)

**Radio Marabu-** 7375 at 2030. This Europirate mixes rock and pop music. Although they are a very tough DX catch direct from Europe, they can sometimes be well heard via a North American relay transmitter. Addr: Wuppertal. (David Styn, Amherst, NY)

**RBCN-** 5855 at 0030. Radio Bob is verifying reports on the station's Monitoring Times Convention replay program, and Barry got one of them. Addr: Atlanta. (Frodge; Williams)

**Robert Tilton Radio-** 6957 at 0130. This strange operation features actual recorded preaching by controversial evangelist Robert Tilton, mixed with rock music. They have returned after a lengthy

absence from the pirate bands. Addr: Baltimore maildrop defunct. (Zeller)

**(unidentified)-** 7415 at 1645. We normally don't list stations that haven't broadcast a copied identification, but Jesse would like some help on figuring out what the 60's rock station was that he heard February 12 on 41 meters. Ideas, anyone? (Rose)

**Up Against the Wall Radio-** 6955 at 0100. Owsley still programs music that brings back the political protests of the late 60's and early 70's, with an easily recognized "oogah" horn interval signal. The station sometimes relays other pirates as well. Addr: Wellsville. (Rose; Frodge)

**Voice of Bono-** 6955 at 0115. J. D. spotted an error (gasp) in the March "Outer Limits." Gary Daniels has abandoned a Baltimore address that the station used to announce, but he can be contacted through a valid maildrop. Addr: Wellsville. (J. D. Stephens, Huntsville, AL)

**Way Gone Radio-** 7414 at 1915. Few have reported Dr. Chicago's station, but Barry noted their blues and rockabilly music with a good signal. Addr: Blue Ridge Summit. (Williams)

**WKND-** 7415 at 1715. The traditional "Canine Dog" programming on this one recently featured a preview of Radio Albatross shows with Radio Animal and Pirate Mike. Addr: Blue Ridge Summit. (Rose)

**WLIS-** 6955 at 2200. Jack Boggin, who still plays genuine international broadcasting station interval signals as though they were hit songs, informs MT that he sent out his 600th QSL in early 1995. On one recent program, all of the interval signals came from pirate stations. Addr: Blue Ridge Summit. (Ross; Rose; Williams; Frodge)

**WREC-** 7385 at 2030. David not only heard P. J. Sparx with comedy and novelty music, but he verified the broadcast after only a month. Addr: Blue Ridge Summit. (Styn)

**WTWP-** 7420 at 1630. Jesse submitted this one as an unidentified logging, but he actually heard what was probably the first broadcast of the station. Their first show, which included rock, reggae, and some comedy such as ads for Tonya Harding breakaway shoelaces. Addr: Wellsville. (Rose)

**Z Radio-** 7418 at 1630. Quite a few DXers have heard this relatively new broadcaster. They mix comedy with commentary on shortwave hobby equipment. Addr: Wellsville. (Rose)

## Award Winning Antenna



Winner of the 94 WRTH award for the most innovative design. High performance MW Loop tunes 530 to 1700 kHz with features unlike any other antenna!

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# WHAT'S NEW?

BOOK REVIEWS AND NEW PRODUCTS

by Larry Miller

Guest reviewers: Bob Grove, Lee Reynolds



## FM Broadcast Transmitter Kits

The micropower broadcasting movement has spawned an interesting sidelight. For those who are frustrated by the limitations of many of the commercial low-power FM broadcast band kits, Steve Dunifer is now offering his own line of high(er) powered FM transmitter kits and accessories from Free Radio Berkeley. Yes, this is the same Free Radio Berkeley that has successfully held the FCC at bay over an unlicensed FM station in California.

Here's the legal run-down on this sort of thing. Technically, Dunifer's kits are not illegal. Putting the kit together is not illegal. When you fire it up, that's illegal. In fact, under the FCC's Part 15 rules, just about any unlicensed transmitter over 100 mW will get you into trouble on the federal level.

Dunifer's kits are complete and come with professionally-manufactured, drilled, and tinned PC boards. Full instructions and diagrams are included. Each unit uses standard power, 12 volts.

The list of kits is too big to go into much detail, but here's an overview of what is available.

The basic kit is the 1/2 to 1 watt FM broadcast band transmitter. What's nice about this

one is that full digital PLL control locks the frequency and prevents drift. It's \$95.00. The 5 watt transmitter lacks the PLL circuitry but has greatly increased punch. It is \$55.00.

If 5 watts of power isn't enough for you, Dunifer has a 25-30 watt RF amplifier kit. It's designed specifically to piggyback on the 5 watt kit and retails for only \$60.00. Shipping on each kit is an additional \$3.00.

Mr. Dunifer will never win a medal for speed; we've ordered several kits and we're still waiting for them to arrive. If and when we do get our order, we'll let you know how it goes. Though you can call Free Radio Berkeley at 510-464-3041, ordering is by check or money order only. The address, where you can also get a full copy of the newsletter/catalog, is 1442-A Walnut Street, #406, Berkeley, CA 94709. Tell them that Larry Miller sent you.

## Converter I

I was having an argument the other day with someone—I don't remember who—and they said that shortwave listeners don't have any interest in scanning and that scanner listeners couldn't care less about shortwave. Though we remained in disagreement on that point, we both agreed, however, that anyone who was interested in sampling the other portion of the spectrum would have to add another expensive piece of equipment to his

or her shack.

But wait a minute. Didn't Grove Enterprises once offer a shortwave converter for scanners? Yes! In fact, it was one of the first pieces of equipment that Bob manufactured. (The close-out version was only a printed circuit board—no case! Boy, have times changed.)

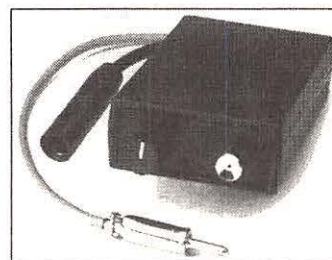
Grove has now introduced a new, completely updated (and with case!) shortwave converter that turns your scanner into a full-coverage communications receiver capable of tuning in global shortwave stations like the Voice of America, the BBC—not to mention spy numbers transmissions, pirate, and clandestine stations. Plus, if your scanner has tunable VHF/UHF SSB capability, you can even eavesdrop on intriguing two-way voice communications as well.

Your scanner must receive at least the 118 to 136 MHz air band. For more details, check out the Grove catalog or call the technical assistance line at 704-837-7081. If you'd like to order, call 1-800-438-8155. The price is \$99.95 plus shipping.

## Converter II

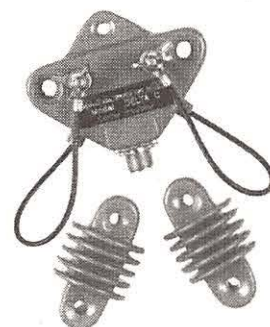
A firm called Micro Tek Products has announced that they are now marketing a product that plugs into your car's AM radio to allow you to hear 49-60 meters shortwave. The Minute-Man Shortwave Converter covers 5000 to 6180 kHz on most car radios. Micro Tek claims that the unit works with both continuous tuning and digital radios. (A fine-tuning control allows coverage between channels on digitally tuned radios.)

Of course, there's nothing to stop you (except for the Motorola connectors) from using the Minute-Man to convert any AM radio into a shortwave receiver.



For more information, call Micro Tek Products at 810-752-3978. You can order by check or money order at Box 563, Romeo, Michigan 48065. The price is \$34.95 postpaid. Tell them that MT sent you.

## Multi-Element Dipole



Alpha Delta Communications has announced a new antenna called the Model DX-Ultra SWL Antenna System. The Model DX-Ultra SWL Antenna System is a multi-element dipole measuring some 80 feet in length. The antenna can be mounted as a dipole or an inverted vee.

Construction, we're told, is pretty solid, utilizing 12 gauge solid copper with grey PVC protective insulation. The Alpha Delta Model DX-Ultra lists for \$119.95.

Despite some bold performance claims and ads in a lot of publications, the antenna had been delayed "due to tooling problems."

## PowerTip!

"Battle tested in Desert Storm, the amazing PowerTip can boost reception on your radios, cordless





and cellular phones!" So reads the hype on the latest miracle antenna booster, (which we encountered too late for our April edition).

"The military has been using this reception-enhancing technology for years. Now you can use it to upgrade range and reception of...any wireless device with an antenna!" And now—can you believe it?—this once-super-secret technology can be yours for only \$19.95.

"To install Powertip, simply slide it over the tip of your present antenna and that's it—your phone will now...pull in distant signals!"

Want to put the power of Desert Storm to work for you, pulling in distant signals and (oh, I almost forgot) "give older equipment new life..."? Then send \$24.95 of your hard-earned money to the well-known radio communications firm, Lifestyle Fascination Inc., 55 Progress Place, Jackson, NJ 08527-3002. You can also order toll-free 1-800-669-0987.

Thanks to Chet Copeland of Washington, DC, who brought this item to our attention.

## Air-Scan #6

Civilian aeronautical. Military. Seaplanes. Helos...

If it flies, Tom Kneitel probably has it in the all-new, 6th edition of his popular *Air-Scan*. Covering the entire VHF aero band (118-137 MHz) and over 6,000 U.S. landing areas, there are frequencies for approach and departure, operations, VOR, tower, unicom, ground control,

weather, Flight Service, and more. At many larger fields, there are also VHF/UHF FM listings for security, fire/rescue, and airline ground and other related services.

In Canada, some 700 private, military, seaplane, and commercial fields are listed, together with their relevant operational VHF aero band frequencies. There's also a frequency sort showing nearly 200 VHF/UHF aero-related frequencies and bands (stretching between 26 and 896 MHz) of special interest.

*Air-Scan* retails for \$18.95 plus shipping and is available from your favorite radio bookseller.

## Rebel Radio

For me, the intriguing thing about shortwave radio is the sheer number of voices. From one end of the spectrum to another, hundreds upon hundreds of human souls compete with one another for the presentation of ideas in a welter of languages and styles that boggle the mind.

Every stage of my working life has involved some aspect of the industry, and I used to imagine myself part of this huge, radio fraternity.

One station particularly caught my attention. It called itself Radio Venceremos and it first went on the air in the late 1970s—a dark time in the Central American country of El Salvador. Listening to Radio Venceremos was chilling; broadcasts began with

## Flash! Drake Drops R8, Announces R8A

The widely-acclaimed Drake R8 receiver has been replaced by the improved R8A which offers better dynamic range, alphanumeric display, single-button function selections and more. Price increase is a nominal \$100. More next month!

the sound of a machine gun firing, and the station's logo was riddled with bullet holes. No one who listened could doubt that the station was broadcasting from the midst of the bloody and brutal civil war. This was a textbook example of a clandestine radio station.

*Rebel Radio* by Jose

Ignacio Lopez Vigil is an incredible story.

It is the history of Radio Venceremos, as told to the author by the people who ran the station. The stories appear to be largely unedited, presented in a swarm of

events and images that last from a few pages to a few paragraphs. The words are unvarnished.

Radio Venceremos began, as many dreams do, with dreamers—university students long on ideas and short on money, but propelled by the slaughter they saw on the streets and by the assassination of the priest they admired. Many joined the rebel movement, rewiring an old Viking transmitter to do double duty on AM radio as an underground station.

Legendary for its longevity—12 years—Venceremos had a

"broadcast no matter what the cost" attitude. Read along for a fascinating story of radio under the gun and on the move. It is radio as it was meant to be—sometimes downright jagged, but always filled with emotion and dedication and ingenuity.

The story is also told as it should be: raw. Regardless of one's political persuasion, it is impossible not to be moved by the dedication of the guerillas, broadcasting under attack by a helicopter gunship, constantly moving, dying on the job. And, yes, there are the perennial

problems with equipment and the always frustrating tangle of human relationships.

In the end, however, Venceremos triumphs, earning a place not only in the history books, but in El Salvador's "legitimate" media. Jon Snow, a television producer, called *Rebel Radio* a "story of courage and self-sacrifice [and] of humor."

*Rebel Radio* is published by the non-profit Curbstone Press, 321 Jackson Street, Willimantic, CT 06226. The price of the book is \$19.95; ISBN # 1-880684-21-7.



## JAVIATION

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Telephone: 011 44 1274 732146 Fax: 011 44 1274 722627

CompuServe: 100117,535 Internet: info@javiaton.demon.co.uk

On-Line Catalogue at <http://www.demon.co.uk/javiation>

### YUPITERU VT-125 & VT-225

Yupiteru have established themselves as the leading manufacturer of scanners in recent years. The VT-125 & VT-225 are two compact, handheld "airband" only receivers with exceptional performance.

The VT-125 is no larger than the palm of your hand, covers 108-142MHz, and has 30 memory channels. It is supplied with 3 x AA nicad batteries and can also be powered from an external 12v supply.

The slightly larger VT-225 has wider frequency coverage to include the UHF aviation bands. 100 memory channels and 10 search banks. Supplied with 4 x AA nicad batteries the '225 can also be powered from an external 12 volt source.

If you would like further information on these or any products please feel free to contact us.

**WIDE RANGE COVERAGE SCANNERS & HF RECEIVERS FROM  
ALINCO-AOR-ICOM-LOWE-RADIO SHACK/REALISTIC-SIGNAL-SONY-UNIDEN-YUPITERU**

Books and equipment for announcement or review should be sent to "What's New?" c/o Monitoring Times, P.O. Box 98, 300 S. Hwy 64 West, Brasstown, NC 28920.

## Hanging On

Gall's Incorporated is advertising a nice-looking vehicle radio holder to secure your handheld radio or cellular phone. The device has a self-locking mechanism that allows it to hold most handhelds in place. A quick release button lets the radio be removed quickly. The holder can be screw-mounted to a dashboard, car transmission hump, or stacking system.

The handheld radio Universal Bracket measures 3-1/2" H x 5" W x 3" D and weighs one pound. \$14.99 from Gall's, Inc., 2680 Palumbo Drive, P.O. Box 54308, Lexington, KY 40555-4308 or call 1-800-477-7766.

## M Street

We're approaching one of my favorite times of the year—FM DX season. Any time now, you'll be listening to the FM radio and you'll notice an unfamiliar station—something that sounds every bit as strong as the local stations, only it's coming out of some place like San Antonio, Los Angeles, Chicago, or Port Jefferson.

That's FM skip, and for some of us, it's as close to heaven as a radio person's going to get. The trouble is that, because the station's from out of town, it's not always easy to identify.

Probably the best book for identifying skip is the *M Street Radio Directory*. This is the book that broadcasters use, and as such it's chock-full of clues that can simplify the identification of stations. First, the book is arranged by state so you can look up likely candidates by city. Each station has a mini-profile, includ-

ing everything from format to phone number. One section lists the stations by call sign; another lists them by frequency. Canadian stations are also included.

This is a great book. Even the smattering of articles in the front are excellent, including "How They Die...The Z File," (off the air). The *M Street* is a professional resource, with a corresponding price tag—\$37.95 plus shipping. (List price is \$44.)

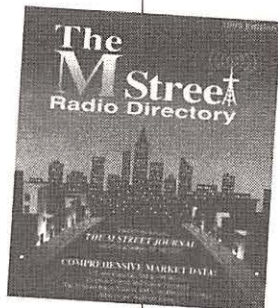
Still, if your heart pounds when the FM skip starts to roll in, you'll want to have an *M Street Radio Directory* on hand. You can order yours from Grove Enterprises or your favorite book seller.

## Norwegian AM Log Book

Reader Mark Humenyk reports that the DX Listener's Club is offering a 230-page book that "lists all loggings of medium wave stations made in Norway over the last 49 years." According to Mark, the book, written in English by Sverre Martinsen and Kjell Arne Olsen, is divided into sections: Europe (except British Isles, Iberia, and international waters), British Isles, Iberia (Spain/Portugal), International Waters, Africa, Asia, Pacific, and the Americas (North, Central and South). Listings include frequencies, opening and closing dates, transmitter sites, frequency changes and more.

The price of the book is NOK 200. You can order using your Mastercard or Visa by writing

Bernt Erfjord, DX Listener's Club, P.O. Box 7080, Vestheimen-4602, Kristiansand, Norway. Tell them that you read about it in *Monitoring Times*.



## Kiwa in Cyberspace

Craig Siegenthaler always keeps his products first-class and his business on the cutting edge. Now, Craig says that he has the complete Kiwa Electronics catalog—in color and complete with product information, photographs, and performance graphs—on the Internet. So, if you're cruising the Internet, stop in at web address:

<http://www.wolfe.net/~kiwa>.

Note that the address starts with h and ends with the a in Kiwa. The tilde (~) must be included. Kiwa also has an e-mail address: [kiwa@wolfe.net](mailto:kiwa@wolfe.net).

Check it out. Kiwa stuff is innovative and always first class. Tell Craig that *Monitoring Times* sent you through cyberspace. (Don't tell him you read about it on an old-fashioned printed page!)

## Miracle Baby Micro Duck



We ran across an interesting scanner accessory. It's called the Miracle Baby Micro Duck. While the manufacturers of most replacement rubber ducks spend their time trying to convince you that you'll hear the moon with their antenna, the Miracle Baby has an entirely different slant.

The Miracle Baby Micro Duck's main claim to fame is its size, and at one inch, it is perfect for low-profile scanning. Now you can take that scanner almost anywhere without being seen. Slip the scanner into a deep pocket and don't worry about that foot-long antenna sticking out—or riding up your stomach if you wear the radio on your belt.

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Micro Duck is also great for in-city monitoring where its natural attenuation will reduce intermod pickup.

The Miracle Baby Micro Duck is \$33.95 plus \$4.50 UPS from DX Radio Supply, Box 360, Wagontown, PA 19376. For more information, call 610-273-7823 or for credit card orders call toll-free at 1-800-753-2060.

## UHF/Microwave Projects Manual

As publications for the hobby market go, the American Radio Relay League (ARRL) maintains its historical leadership for accuracy, thoroughness, readability, illustration and economy. This publication is no exception. Its 330 liberally-illustrated pages examine important aspects of equipment design, test, and use at VHF and beyond.

Excellent insights are provided to assure the reader of correct shielding, layout, enclosing, component handling, soldering, and other techniques of success. An excellent section on microwave antenna design is included.

Not merely a how-to for the avid experimenter, the manual is a superb tutorial for the RF design engineer. Although we were disappointed to find no receiver or transmitter projects, there were ample activities available to choose from, including simple preamps, power supplies, filters and converters, and advancing to transverters, RF amplifiers and test equipment.

The *ARRL UHF/Microwave Projects Manual* is \$20 plus shipping from the American Radio Relay League, 225 Main Street, Newington, CT 06111-1494.

—BG

## Correction

The phone number for Contact Connect Systems, Inc., maker of the CD-2 communications decoder (Apr., p. 96), contained a typographical error: it should have been 800-545-1349. Thanks to the reader who alerted us and supplied the correct number.



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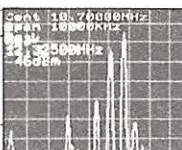
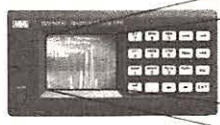
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For years the professional intercept operators have use SDU's to "look" for signals. The SDU5000A is digitally compatible with the AR3000A, controlling all receiver functions. This system becomes even more powerful with the addition of a PC Computer. See a signal, push a button and you've got 'em. Hear audio, read exact frequency, measure signal strength, store all above in a PC. This system is awesome! Full details on request.

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# AOR SDU5000 Spectrum Display

By Lee Reynolds, KD1SQ

"Intriguing and expensive" might best sum up one of AOR's newest offerings—the SDU5000 Spectrum Display Unit.<sup>1</sup> Only recently released onto the U.S. market, this device is a good first attempt at producing a SDU that both more closely mimics much more expensive professional spectrum analyzers, but can still be linked with a receiver (albeit only the AR3000A) to provide a number of special abilities.

Built into a compact box measuring 18"x4"x10", the '5000 is a compact and elegant-looking device. The front panel sports a membrane type control keypad, 2" color LCD display, and a power switch. On the rear apron are connectors for power, RF in, video out, PAL/NTSC selection, receiver control, and PC interface. Internally

pleasure to look at the display scrolling along and to be able to pounce on a signal 20, 100, 500, or even 1000 kHz away when it pops up on the screen!

## Pros:

- Well built, compact and good looking.
- Easy-to-use menuing system, flexible sweep width, excellent display if an external monitor is used.
- Used with the AR3000A, provides radio control and other useful features not easily found elsewhere.

## Cons:

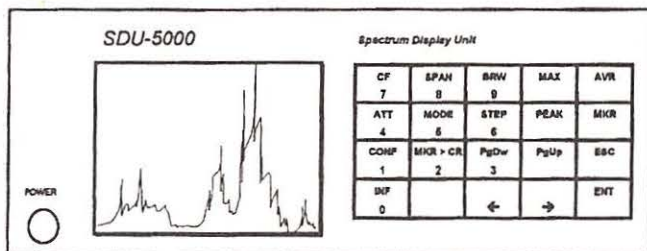
- The keypad is set up with an unconventional numeric layout; the keyboard itself is of the membrane type and provides insufficient tactile feedback.
- The case is rectangular with a vertical front panel which makes the LCD screen very hard to read from most angles—a tilt bail or an angled front panel would be a great improvement.
- The unit generates noticeable RF noise at some frequencies—this is something AOR should rectify as quickly as possible. It is not acceptable to have a device, designed to work in close proximity to a scanner, that masks the signals it is supposed to help find.
- No software exists at this time for use with the PC interface port on the SDU. Use of the SDU with the AR3000A will not permit computer control of the AR3000A without having to use a switch box.
- The manual is extremely basic at present.

## Summary:

My impressions were mixed—the SDU5000 is a very useful adjunct for the serious scanner listener; one that can provide that extra edge in locating and identifying signals. When used with the AR3000A it becomes an easy-to-use, fast-tuning, surveillance device. On the other hand, the high price and limited applications (when used with other receivers) is a definite detraction for a buyer. The author suggests that if you have an AR3000A—buy it—it's far too useful a tool to pass up! If you use other receivers and need spectrum analysis capability then you may do well to consider whether a less expensive device or a second-hand spectrum analyzer might meet your needs better.

*In the U.S., the SDU5000 lists for \$1,199; contact the U.S. distributor for a dealer nearest you, Electronic Distributors Co. (EDCO), 703-938-8105/938-4525 fax.*

**A Note of Explanation:** A spectrum display unit does just what its name implies—it produces a visual representation of a piece of the radio spectrum on a screen. The screen acts as a graph—the vertical axis indicates signal strength, and the horizontal axis displays the radio frequency. In operation, you will see a line with peaks appearing along it, as shown in the line art above. The peaks are radio transmissions on either side of the channel to which the spectrum display is tuned. The bigger the peak, the stronger the signal. The line constantly fluctuates as stations begin or end transmissions. This provides a very effective way of monitoring a wide chunk of a band without using multiple receivers, and is also a great way to search out new frequencies.



the layout is quite tidy and clean; the printed circuit boards appear to be well designed, and the interboard wiring harnesses and modular design seem to be set up for convenient servicing.

The SDU5000 requires either the AR3000A or a receiver with a 10.7 MHz IF output; it has a built-in, switchable amplifier to help it cope with receivers of different IF output levels. The sweep width of the SDU is user-programmable between 1 kHz and 10 MHz in 1 kHz steps (a nice feature!); the display mode can be changed (direct, peak, and average); and provision for hookup of an external monitor is made. When used with the AR3000A, a number of additional functions and display modes become available.

Initial setup of the unit was fairly simple, consisting of plugging in the power cube (supplied), the BNC-BNC RF cable (not supplied), and the DB9-DB25 SDU-to-receiver control cable (also not supplied). You then (after powering up the SDU) configure the device for either stand-alone mode (for use with a receiver other than the AR3000) or for use with the '3000.

Tests were conducted with two receivers—the author's ICOM R7000 and an AR3000A kindly loaned by Edco Electronics. The SDU worked very well with the AR3000A, as might be expected, and performed acceptably with the R7000. Sensitivity with the AR3000A was excellent, showing signals that were only just above the noise floor, but with the R7000 a lack of sensitivity was noted—a signal had to be in excess of an S1 to produce a visible peak on the display.

Sweep time (the time it takes for the SDU to check across the selected bandwidth) was noticeable, making true, realtime tuning slightly difficult, but acceptable. A number of bands were checked and very useful displays of transmission traffic were observed.

The SDU really shines when it is used with the AR3000A—you then get direct frequency and signal level display on the screen, the ability to position a crosshair cursor on an interesting looking signal, and, with the push of a button, tune directly to that signal. It's a

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CT ----- 100	NM ----- 94
DC ----- See MD	NV ----- 96
DE ----- 48	NY ----- 504
FL ----- 472	OH ----- 480
GA ----- 336	OK ----- 230
HI ----- 56	OR ----- 127
IA ----- 272	PA ----- 464
ID ----- 128	PR/VI ----- 116
IL ----- 520	RI ----- 56
IN ----- 320	SC ----- 164
KS ----- 252	SD ----- 121
KY ----- 223	TN ----- 261
LA ----- 212	TX ----- 840
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ME ----- 120	VT ----- 72
MI ----- 365	WA ----- 172
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MO ----- 280	WV ----- 136
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Table 1

DE, HI, ME, NH, PR&VI, RI, SD, VT, WV, and WY are \$9.95 each state.

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## The Uniden Bearcat BC860XLT Scanner

**T**he new Uniden Bearcat BC860XLT is a mid-line, base scanner designed to operate only from 117 VAC using a 10 VAC stepdown transformer (supplied). It is reminiscent of the discontinued 50 channel BC855XLT, but the BC860XLT sports 100 channels in 10 banks. According to the operating guide, memory is backed up for seven days in the event power is removed from the scanner, but we didn't verify the specification.

Individual lockout and 2-second rescan delay may be selected for each of the memory channels. Uniden should be commended on the design of the channel lockout. In both the BC860XLT and BC220XLT, channels programmed with a frequency of 0.0000 are automatically locked out so no time is wasted scanning them. We wished for similar behavior in our discussion of the 1000 channel Radio Shack PRO-2035 in January 1995 *Monitoring Times*.

Frequency coverage in the new BC860XLT is:

- 29.0 - 50 MHz
- 108 - 137 MHz (AM)
- 137 - 174 MHz
- 406 - 512 MHz
- 806 - 956 MHz, excluding cellular phone bands

The tuning step size is fixed at 5 kHz in the 29 - 50 and 137 - 174 MHz bands and 12.5 kHz elsewhere.

The reception mode is not selectable and is set to narrow band FM except in the civilian aviation band. The BC860XLT has one pair of search limits and the step sizes are factory set. Up to 10 frequencies can be locked out during a search—a very desirable feature, useful for skipping birdies and unwanted paging frequencies within a targeted search range.

The Weather button causes a scan for activity through seven preprogrammed frequencies used for NOAA weather broadcasts.

The BC-860XLT is a conventional double conversion superheterodyne receiver with a first IF of 10.8 MHz. The reviewer has several scanners in the house, and signals from older Bearcat models with the same IF interfere with the BC860XLT. The other scanners had to be turned off before testing started to avoid false results.

The Twin Turbo™ feature means the BC860XLT is specified to scan at 100 channels per second and search up to 300 steps per



second. The Uniden box and documentation should be more candid. The Turbo search feature is heralded on the box in two places and three places in the operating guide, but the following important restriction is only mentioned once inside the guide:

*The 300 step per second search speed is only selectable in the 29 - 54 and 137 - 174 MHz ranges. Search speed is fixed at 100 steps per second in the aero band and above 174 MHz.*

Even with the limitation, the Uniden scanner is faster than the Radio Shack HyperScan™ models made by GRE.

True to its ancestors, the BC860XLT is easy to program and there's no Program key on the keypad. Merely position to the memory channel you want to program, type in the frequency digits, and push Enter. In most cases, you need not even press the "." key. Press Delay and/or Lockout if you desire those features. As in other Bearcat models, if you make a mistake, press the "." key twice. That's all there is to it.

As in the older BC100XLT and BC200XLT portables, there are 10 priority channels, one per bank. The BC860XLT is more flexible because the user can designate any channel within a bank as a priority channel. When enabled, the priority channels are checked every two seconds.

### ■ External Design a Weak Point

The BC860XLT is packaged in a flat, wedge-shaped plastic cabinet often associated with lower and middle line models. You won't be able to stack your favorite accessories on top of the cabinet, nor will you be able to read the display across the room. Due to its shape, this scanner is better suited to placement on a coffee table than on a shelf underneath other equipment.

The reviewer uses an external speaker with most base scanners but it wasn't necessary with the BC860XLT because the internal 1 watt speaker was aimed more toward the user, not at the floor or ceiling. Only a speaker mounted on a vertical front panel would be better situated.

The LCD (liquid crystal display) is illuminated dimly by four light-emitting diodes. Although generous in size, the display lacks the striking contrast of the brightly lit BC760XLT, the new Radio Shack PRO-2035, or LED and vacuum fluorescent displays in older Electra/Bearcat models.

Using the keypad requires some practice. The odd rubber keys are shaped nothing like human fingertips, which roll off the tops too easily. Labels painted above the keys were difficult to read when the glossy cabinet finish reflected glare from room lighting. The volume and squelch knobs are smooth and shallow, making them harder to grasp.

The BNC antenna jack on the older BC855XLT was mounted through a hole in the plastic case and was prone to becoming loose, eventually breaking the connection to the printed circuit board. The BNC antenna jack on the BC860XLT is fastened sturdily to a metal bracket instead.

### ■ A Look Inside

The majority of components inside the BC860XLT are mounted on a large printed circuit board. The BC860XLT and portable BC220XLT share most of the same circuitry. They both use the same 800 MHz front-end boards and the same plug-in PLL (phase locked loop) boards, and appear to have the same IF chip and filters. Our BC860XLT CPU chip was marked UC1612A and the CPU chip in our older BC220XLT was marked UC1612.

Steve Donnell published an innovative modification in the January 1995 *RCMA Scanner Journal* to enable cell band reception for the BC220XLT. Perhaps the same modification could be applied to the BC860XLT. It's tempting to conjecture that the BC860XLT can be easily modified to act

as a BC220XLT, with 200 channels and a Service Search feature, but we couldn't pursue this without a schematic.

### ■ Test Modes

If the BC860XLT is powered off, you can enable the following test sequences by pressing the three keys listed simultaneously, while turning the scanner on:

- 2 9 MANUAL - clears all 100 memory channels, search limits, resets priority channels to the first channel in each bank
- 2 9 LOCKOUT - tests all LCD segments
- 2 9 SCAN or 2 9 TURBO - loads test frequencies into channels 1 - 21 and search limits

Be sure to write down any important frequencies you have programmed in the BC860XLT before using the test modes, as memory will be altered.

### ■ Strong Performance Except for Images

As mentioned earlier, the BC860XLT uses a 10.8 MHz first IF, so it's no surprise that images of signals are heard 21.6 MHz below their proper frequency in the aero band and 21.6 MHz above on the other bands. The operating guide does not specify image rejection, so we measured it. Image rejection at 465 MHz range was only 1/3 as good (measured in decibels) as it was at 168 MHz, and there was almost no image rejection at 925 MHz, i.e., images were almost as strong at 925 MHz as the original signal transmitting 21.6 MHz lower.

Digital and voice paging images from a 152.0075 MHz transmitter located 38 miles away clobbered our BC860XLT in the aero band at 130.4 MHz. Signals from 2-meter ham repeaters can be heard both in the 166.1 - 169.6 MHz and 122.9 - 126.4 MHz ranges, and 440 MHz ham repeaters show up in the 460 MHz band. Very strong cellular phone images were present from 894 - 915.6 MHz. Simple arithmetic shows about 86% of the locked-out 869 - 894 MHz cellular phone band is thus "overlayed" on top of 894 - 915.6 MHz. Cellular phone channels are spaced at 30 kHz increments, and the BC860XLT tunes in 12.5 kHz increments.

We switched a roof-mounted Antenna Specialists AV-801 antenna between the BC860XLT and a Radio Shack PRO-2006 scanner. Both were close in sensitivity with these exceptions: the BC860XLT was slightly more sensitive than the PRO-2006 near 125 and 465 MHz and slightly less sensitive near

854 MHz. We heard some, but not much, intermod on the BC860XLT, and there was much less overload from strong signals than in the older BC760XLT and BC800XLT models.

Reception in the 853.8375 - 853.9125 MHz range was hampered by interference from TV channel 50, which transmits on 691.75 MHz. Although the BC860XLT is designed to use the 6th harmonic of the local oscillator in the 800 MHz band, the TV signal mixes with the 5th harmonic of the local oscillator and produces a 10.8 MHz difference which passes through the IF stage.

The selectable Data Skip feature was somewhat useful on the voice channels in trunked systems, causing the BC860XLT to resume scanning when a mobile stopped talking, but while the repeater carrier was still transmitting (i.e., a dead carrier). Alas, the Data Skip wouldn't skip over a trunked data channel. It did skip over the Morse code tone identification used by a local repeater, so remember to disable this feature if you want to hear the callsign. You cannot use Priority and Data Skip simultaneously, nor will Data Skip work while searching the aero band.

A good scanner should let you hear what's being said, then shut up. That's why scanners have a squelch control. Several minutes of listening to a noisy squelch tail—the noise burst at the end of a transmission—can rile the most patient listener. The BC220XLT squelch takes too long to close at the end of each transmission. Although the BC860XLT and BC220XLT share a lot of circuitry, our BC860XLT squelch closed a bit faster but the squelch tails were still somewhat annoying.

Helped by the top mounted speaker, the audio quality is excellent—much better than the PRO-2006. It is crisp and remains relatively free from distortion, even when the volume control is adjusted for ear-splitting, room filling levels.

### ■ Conclusion

The BC860XLT's cabinetry, knobs, and keyboard could be improved, but it is easy to program and includes the most important features and more. Except for image interference, the BC860XLT works well for a mature design. I would recommend it to someone new to scanning, or who wants to upgrade from a 16 or 20 channel unit but doesn't want to spend the money for a premier model using up-conversion circuitry.

Manufacturer's list price—\$319.95. -ed.

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## ■ ICOM IC-R71 Receiver, the Ultimate Veteran

Last month, we reported on the ultimate portable for weathering the test of time, the Sony ICF-2010. That model goes back over 10 years, but it got us to thinking about what the longest-running current model might be.

(Roll of drums)...here's the winner: the ICOM IC-R71, a tabletop model which first appeared in 1984 several months before the '2010! In the past, other models, such as the erstwhile Zenith Transoceanic, were on the market for longer. But, like Chevrolet Corvettes, most of these were actually series of different models sold under the same names.

The 'R71, sold in most countries as the 'R71A (elsewhere with "D" and "E" suffixes), originally listed for \$799, but inflation has taken its toll. Suggested retail is now \$1,440, although the street price is usually a couple hundred dollars less. The receiver that gets the top rating in the 1995 *Passport to World Band Radio* is the \$999 Drake R8, so right off you can see why the 'R71 isn't one of today's more popular models.

### ■ Flexibility is chief feature

You don't have to take the square root and cube it to see the 'R71's chief characteristic: flexibility. Its myriad and usually diminutive controls allow signals to be massaged in a variety of ways so that the unintelligible might become intelligible, the hard-to-hear made more pleasant. But it's a DXer's rig, lacking the synchronous detection and other audio-quality pluses that the Drake R8 or Lowe HF-150 incorporate to make shortwave-program listening noticeably more pleasant.

The 'R71 includes keypad tuning, a nice tuning knob and 32 channel presets, as well as a handy "two-VFO" configuration. Synthesizer resolution is to 10 Hz, and frequency readout is to the nearest 100 Hz. All this is more than adequate, but the small concentric knobs, an offbeat bandwidth-selection arrangement, and cumbersome keypad software make operation less pleasant than it could have been. Still, in this regard it's hardly any worse than the top-rated Drake R8.



### ■ Generally outstanding rejection of adjacent signals

The 'R71 comes with three voice (AM and SSB/ECSS modes) bandwidths. The 6.8 kHz wide-AM bandwidth, which uses a ceramic filter, is somewhat broader than it should be, which limits the effectiveness of the 'R71 for listening to ordinary shortwave broadcasts. That bandwidth also has ultimate rejection that's quite good, but not spectacular.

Fortunately, some shortwave specialty firms offer high-quality replacement filters for the wide-AM position. If you're mainly into listening to programs from international broadcasters, you may wish to look into this useful modification.

But if you're into serious DXing in the ECSS mode, the remaining, more narrow bandwidths—3.1 and 2.4 kHz—are arguably the main reason to consider this receiver, even if the 3.1 kHz position is already somewhat narrow for listening in the AM (non-ECSS) mode. These bandwidths, which use crystal-lattice filters, perform superbly—with top-notch skirt selectivity and breathtaking ultimate rejection. Coupled with a first-rate frequency synthesizer, and superior third-order intercept, dynamic range, blocking and phase noise, they allow the serious DXer to ferret out a number of weak signals that otherwise would be obliterated by strong signals of one kind or another.

There is also what ICOM calls "passband tuning," which is actually a variable-bandwidth control. The filter that comes standard with this feature is not equal to the task, but with ICOM's optional higher-quality filter replacement it works well. A number of shortwave specialty firms also offer similar filters.

### ■ Notch filter tuning range limited

Also aiding in "DX-ability" is a tunable notch filter to attenuate heterodyne interference from carriers operating on nearby frequencies. That's the good news. Alas, this notch doesn't tune broadly enough to knock out the 5 kHz within the shortwave broadcasting segments. For that reason, it functions only in the single-sideband and so-called "ECSS" modes—not the AM mode used by shortwave broadcasters.

For program listeners, this is an obvious drawback. But for serious DXers, who usually listen in the ECSS mode anyway, it's adequate. Fortunately, the 'R71's stability, essential for worthy SSB/ECSS reception, is nothing short of superb.

### ■ First-rate sensitivity to weak signals

The 'R71 also comes with a switchable preamplifier to aid in DXing. When it's on, sensitivity to weak signals is excellent. Thanks to the set's superior dynamic range, if you're within the Western Hemisphere the preamp can be left on for nearly any kind of shortwave listening, with overloading rarely being a problem.

Yet, cross-modulation *can* be a problem when the sophisticated noise blanker is used. While this feature can be quite effective at reducing certain types of noise and pulse-type signals, unlike the preamplifier it is best to leave it off unless it's needed.

### ■ Superior for DXing broadcast and utility signals

All this SSB and DX orientation points to another of the 'R71's high points: utility and ham DXing. Virtually all hams, of course, rely on transceivers. But if you're into utility DXing, you'll be hard-pressed to find a better rig than the 'R71. The only rub is that the synthesizer only resolves to plus or minus 5 Hz, so in the absence of synchronous detection there's nearly always a tiny degree of "falseness" in the quality of audio reproduction. We haven't found this to be a drawback.

to reception of NBFM or non-voice utility signals, however.

### ■ Operating software battery dependent

The 'R71's RAM-resident software erases if its built-in backup battery runs down. Much has been made of this, and for good reason. Should the software need to be replaced, you'd be at the mercy of the ICOM repair facility, which does not have the best track record for supporting discontinued models. Still, that battery has an extremely long life, and even after 11 years we haven't been receiving complaints about this. So the problem appears to be more one of possibilities than probabilities if you replace your receivers every 10-15 years, as most people do.

For mediumwave AM ("BCB") DXing, the 'R71 is a mixed bag. On one hand, its ability to receive faint signals that are adjacent to powerhouses is nothing short of top-notch. That's an important variable in the "AM band." However, the set is not as sensitive as it could be within that band, in part because the preamplifier is designed not to work below the shortwave spectrum. Some outboard amplification can resolve this, as can modifying the set so the preamplifier works within the AM band.

However, the best solution is the most obvious: Obtain a first-rate AM-band antenna, such as that from Kiwa. Too, if you're seriously into AM DXing, join the National Radio Club (Box 118, Poquonock CT 06064), which offers tips on all kinds of fixes for all sorts of AM-DX problems.

### ■ Overall Findings

In the final analysis, the 'R71 excels in broadcast and utility DX reception, particularly where weak signals are being clobbered by interference from adjacent-channel signals. However, the Drake R8 has pretty much stolen the market from the 'R71 for tropical bands DXing, where hair-curling ultimate rejection is not a primary concern. Mainly, the R8's superior audio quality—it sounds much better than the 'R71—allows even faint DX voice signals to be copied slightly better than they can be on the 'R71. However, technology never stands still, and someday the R8 will almost certainly be knocked off its pedestal by another model with even greater "copyability."

A final caveat. ICOM's quality of production is arguably the least good of any of the current crop of tabletop and portatop manufacturers. If you decide to purchase an 'R71, be sure you obtain it from a dealer who will stand behind the product.

## MAGNE'S PRODUCT SUMMARY

### ■ Grundig raises Satellit 700 price

With the dollar flagging against the mark and yen, price rises on some world band radios are inevitable. Already, one has taken place: On March 1st, the Grundig Satellit 700's suggested retail price was raised to \$699.95. This model is manufactured in Portugal by a German firm, so the rise was not unexpected.

On the other hand, Sony tells us that they currently have no price rises scheduled—partly because they already had a price increase last November.

### ■ Watkins-Johnson HF-1000 difficulties continue

Some months back, Watkins-Johnson indicated to us, as well as some of its customers, that a wide variety of much-needed improvements in its pricey HF-1000 would appear around February or early March of this year. That time has come and gone, with no sign of the promised improvements. Too, the Watkins-Johnson people who were to have appeared at the March Kulpville Fest with an improved version did not materialize. Who did appear was a number of HF-1000 owners, some of whom expressed serious disappointment with the continuing flawed performance of their units, even to the point of possibly selling them if W-J couldn't come up with satisfactory solutions.

Moral: Wait until these difficulties are resolved and checked out before considering the purchase of this model.

### ■ Alpha Delta introduces new "DX-Ultra" antenna

On a happier note, Alpha Delta has come out with a new 0.5-30 MHz antenna, the "DX-Ultra," \$119.95 list. The antenna's designer tells us that it works best as a horizontal dipole, but also can be mounted as an inverted-V or sloper. Its length is fully 80 feet, so it's not for every backyard.

We've reviewed the design of this new model, and in principle it should result in an improved signal-to-noise ratio over that of its "Sloper" model, which received such high marks in our detailed RDI White Paper on outdoor antennas. Too, it comes with built-in static discharging—although *no* static discharger is a safe substitute for disconnecting the antenna when there is a nearby thunderstorm.

### ■ Sangean SG 789A antenna keels over

Finally, further to our recent review of the new Sangean SG 789A, I took one with me for extended testing on a lengthy trip, only to find yet another drawback: The antenna swivel works loose. There is a tiny Phillips screw that can be tightened to overcome this, but torque it carefully so as not to damage the screw head, or else you'll be stuck with an antenna that flops over faster than a sailboat's broken mast.

*This equipment review is performed independently by Lawrence Magne and his colleagues in accordance with the policies and procedures of International Broadcasting Services, Ltd. It is completely independent of the policies and procedures of Grove Enterprises, Inc., its advertisers and affiliated organizations.*

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## A Look at the New Litter of CATs

Not since the Renaissance has there been such an explosion of knowledge as we now witness almost daily. What was considered improbable science fiction thirty years ago is now commonplace and being sold in cut-rate discount outlets. Technological advances in electronics are moving so fast that the so-called state-of-the-art product becomes a "has-been" in less than nine months.

Computer aided radio monitoring hasn't stood still, either. I was recently reminded of this fact when I received Computer Aided Technologies' new 1995 catalog. I first contacted them in 1991 concerning Scancat version 1.0—one of the most universally-used radio control, terminal control, and logging programs; now they are offering ScanCat version 6 and their new ScanCat-Gold. Also in their catalog is CopyCat-Pro—a new version of their terminal control software—and the much-talked-about Hoka Code-3 decoder with software upgrades.

Let's see what these guys have been up to during the last year, starting with the ScanCat family. Since we have done exhaustive reviews of some of these products in past columns, we'll basically summarize the new features.

### ■ High Compatibility

ScanCat version 6 retains all the user-friendliness of the previous versions and adds a bunch of new radios that it can control,

without dropping any of the old ones. In fact, both version 6 and the more expensive Gold, support the same wide range of radios (see Figure 1). This impressive list of over thirty radios covers both shortwave and scanning receivers, including the OS456 board for Radio Shack scanners, AOR's 8000, and Watkins-Johnson's HF-1000.

But, as we know, monitoring methods are very different between shortwave and VHF/UHF. ScanCat has user-programmable features which allow you to tailor the program to your type of listening. Using the program with a scanner, it felt as if it had been made for that use with such user-selectable features as: spurious signal (internal or computer-generated signals) lockout, stop/resume scan mode selection, search and store mode between a preset or user-defined frequency range, and a graphical output of active frequencies—in my opinion, just about everything a monitor wants to do with a VHF/UHF scanner. For those using ScanCat with a shortwave receiver, the program will feel just as comfortable.

Scanning a list of previously-stored frequencies by station name is possible. You can load a list of frequencies and modes from a database from other sources, frequencies which you have entered and stored in ScanCat, or a list of active frequencies which ScanCat has generated itself.

One of the new features added to version 6 is random file-scanning capability. The number of files that you can scan is limited only by

the free space on your hard drive. Previous versions allowed the user to store as many frequencies as desired, but each file had a limit of three hundred frequencies. The new random retrieval method works very well and does not require unloading and loading files. Search time seemed to be increased by about 10% over the non-random method.

The terminal window is displayed very conveniently with a keystroke, replacing the logging screen. It displays the decoded data of any terminal with a serial output, such as those made by AEA or MFJ. Data sent to this terminal window can be captured and stored to a disk file for later recall and use in a text/ASCII form. Although you'll most likely use the Terminal mode on shortwave, I used it with my scanners and PK-232MBX to decode Ham packet signals on 2 meters with no problems.

### ■ The Evolution of ScanCat-Pro

This latest version of ScanCat has really evolved from the now-discontinued ScanCat-Pro, incorporating most of its advanced features, which we've barely touched on. For most monitors ScanCat version 6 will do it all.

Version 6 doesn't look very much like its ancestors. It looks better, does a lot more, and still maintains its easy, intuitive operation. The price, however, has been increased to \$69.95 from its 1991 price of \$50—not bad when you consider the large number of added features and functions.

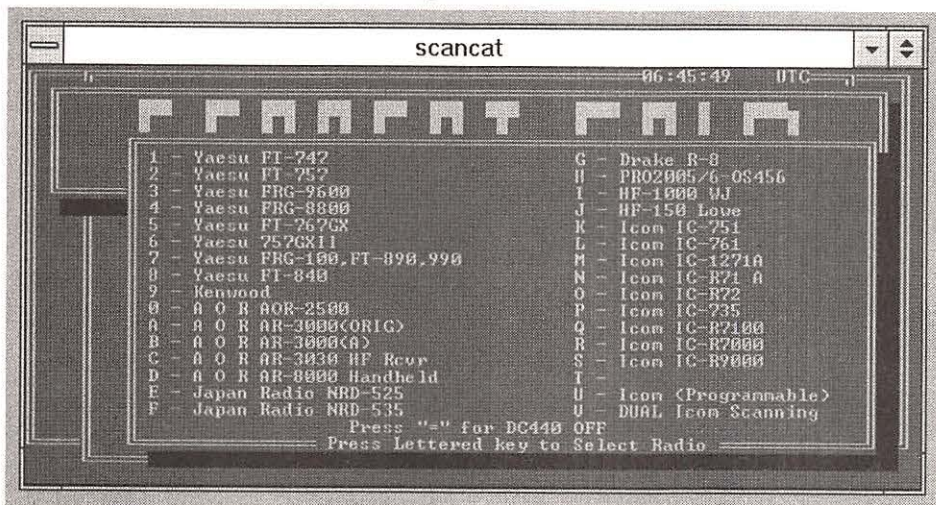
Almost as amazing is that the computer system requirements have remained so simple. Even an old 286 with 640K of RAM, with a single low density disk drive, serial port (two if both the terminal and control functions are used) and DOS 3.0 or higher can be used. It will even work with a monochrome monitor and no graphics card.

A real plus for the first time radio-computer user, is the *live* technical support that Computer Aided Technology offers its customers on all their products, *free of charge*. Their attitude is that satisfied customers are good for business.

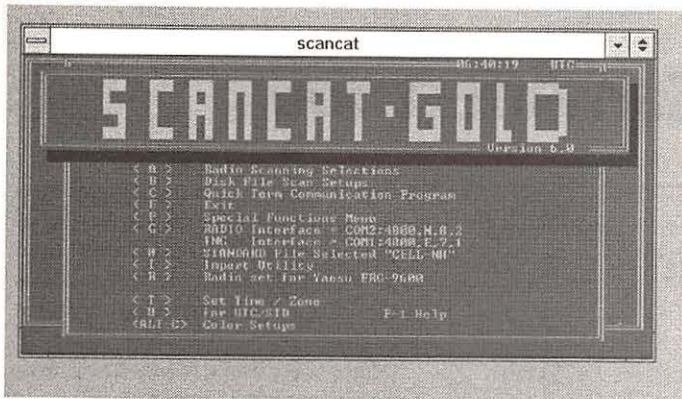
### ■ Good as Gold?

Now what about the high performance, super-charged hot-rod of the product line—ScanCat-Gold? What makes it different? Is it

FIGURE 1: List of radios supported by GOLD and ScanCat 6



**FIGURE 2: Main menu screen of Gold**



worth the \$25 increase over version 6? Good questions.

Unlike older versions of ScanCat, ScanCat Gold (just called Gold for our discussion) cannot be run from a floppy. Its 1.6M of program files must be installed on a hard drive. The public domain Install program that is included is all right, but at the \$100 level I would have expected better. For example, the source, destination drives, and the sub-directory must be inserted all at once with the Install command. Most commercial install programs today walk the user through the possible choices individually by reading the owner's system configuration—a small detail, but one which could complicate installation on computers which already have an older version of ScanCat installed.

The main menu in Figure 2 looks exactly like the latest non-Gold version. Once again the impressive list of supported radios is available. After loading a file the familiar generic radio appears. So far everything looks and feels exactly as all ScanCat users would expect. But ... wait. The keystrokes appear to turn into screen actions instantaneously!

To make sure the feeling of speed was not an illusion, I went back to ScanCat version 5. Sure enough. Gold is clearly faster. On past versions, turning on the optional squelch detect cable—which the program uses to detect the presence of a signal and stop the scanning—produced a marginally acceptable scanning speed.

Not so for Gold, which covers the same ground almost three times faster on a 386DX33 machine! You can see the speed benefit in most all the operations of Gold. Yet, there is no new set of operational instructions to learn. The intuitiveness of the opera-

tion of CAT's software has always impressed me. They have designed their software products so that within five minutes of loading the software you can use it with little reference to the instruction manual. Gold continues this tradition.

### ■ What's under the hood?

OK. So the increased speed can burn data "rubber." But does it have guts? Well, we spoke about file handling above. Gold goes one better by allowing you to link up 15 individual files; that's around 4500 frequencies! This, plus the almost unlimited random file option, will satisfy the most voracious frequency appetite.

If you have a PRO-2005/2006 equipped with an OS-456 control board, or a DC440 tone decoder, then ScanCat Gold's DTMF logging option will store tone information to a file called DTMFTONE.TXT. This can be very useful in situations where the tones are either unexpected, or occur at a high rates.

Another new feature is what I call "comments command macros." This mouthful gives the user the powerful ability to include terminal control commands in the comments field of each logging. Say you decoded 75 Baud RTTY on 14.096 MHz in USB. When you log the frequency and mode into Gold you can also include commands which will set your PK-232, for example, to RTTY and 75 Baud. The total monitoring environment now can automatically control the TNC as well as the receiver's frequency and mode.

Although there are many other Gold features, I want to mention a modification that has been made to ScanPort—the file import-

ing program which comes with the package. ScanPort enables the user to bring frequency data into Gold from other sources, such as word processors, CD ROM files, and even competitor programs. The new feature checks for duplications, and removes them to speed up scanning and reduce the file size. This is a great time saver if you get your information from different sources. The company is considering offering the ScanPort upgrade to non-Gold users for around \$25.

### ■ Windows Washing

For those of you addicted to Windows, you'll be happy to know that if you have enough memory (8M in my case) I had no problems running ScanCat v6.0 or Gold *once I made a modification* to the ScanCat.PIF file.

Remember at the beginning of our discussion I commented on the lack of sophistication in the Install program? Since I wanted to compare the Gold version and the ScanCat I usually run on my system, I changed the default ScanCat sub-directory to ScanGold. When I went to try Gold under Windows I got the error message that the sub-directory specified in the PIF file did not respond.

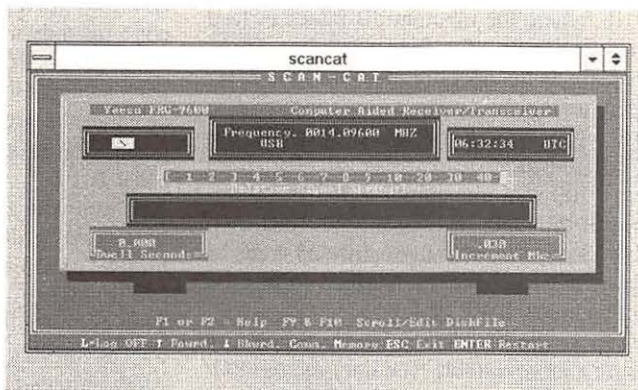
Using a file editor such as PC Tools I took a look at the ScanCat.PIF file and found that the install program had not changed the program location to the new sub-directory. This was easily done with PC Tools. Going back to Windows I clicked on the Scangold directory, then on the Scancat.EXE file. You must also insure that Gold is operating in the "full screen" display option by clicking on the main Windows' command button, at the top left of the screen. Finally, Gold took off and operated just like it was in DOS.

### ■ So What Do I Think?

At \$94.95 ScanCat Gold is in the range I consider pricey. In fact, I look at any product at this price very, very carefully before I buy, asking myself if I really need it and how much will I use it. In my opinion, few, if any, programs approach ScanCat Gold's combination of power, flexibility, and ease of use. Jim Springer, the author of all versions of ScanCat and owner of Computer Aided Technologies, has tried very hard to keep all his products user-friendly and a good value. I believe these products reflect his high standards. Computer Aided Technologies (P.O. Box 18292, Shreveport, LA 71138) can be contacted on (318)-636-1234. See their ad in MT.

We'll take a look at CAT's other products, CopyCat-Pro and Hoka Code 3, over the next few months.

**FIGURE 3: Gold's Radio control screen**



## SWR — How it Can Affect You

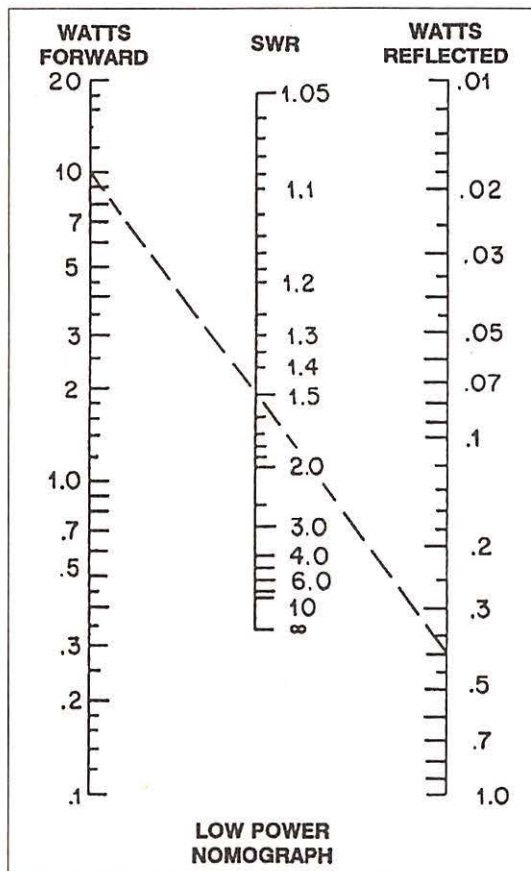
**S**WR, or "standing wave ratio," is a term that is heard almost daily as we monitor the amateur radio bands. We read about it in antenna ads, and many magazine articles contain references to SWR. It is an unseen condition that may exist whenever two objects of like or unlike impedance are connected together in an operational system.

The most common reference to SWR (sometimes called VSWR, or voltage standing-wave ratio) is in relation to antennas and feed lines. But, SWR is a consideration in other circuits as well. For example, a transistor RF power amplifier must be matched carefully to the antenna feed line in order to extract the maximum amount of RF output power. Filters in receivers, for another example, need to be matched to the tubes or transistors that serve as terminations for the filters. Typical filters found in receivers are IF filters (to provide acceptable selectivity for SSB, AM, and CW reception) and fixed-tuned receiver front-end filters.

### ■ A Closer Look at SWR

An SWR greater than the ideal 1:1 ratio results when unlike impedances (ac resistance) are connected together and power is caused to flow between those points. A good example of this may be seen when you attach a coaxial line to the feed point of a dipole antenna. An important fact to remember is that "maximum power transfer between two ac or RF circuits can occur only when existing unlike impedances are matched, or the same." This means that if an antenna is fed with, say, 52-ohm coaxial cable, the antenna feed point should also exhibit a 52-ohm impedance. This would result in an SWR of 1:1, which is what we always seek.

SWR affects transmitting and receiving antennas in the same way. Although the signal power picked up by a receiving antenna is miniscule, that signal energy must travel down the feed line to the receiver with the least amount of loss along the way. At frequencies below 30 MHz, an SWR as great as 2:1 is generally acceptable, since the loss in the feed line for a 2:1 SWR is seldom greater than 1/2 dB (decibel; power referenced to 1 watt). It is unlikely that most human ears could detect even a 1 dB change in signal level. I



**FIGURE 1:** Nomograph for determining SWR from known RF power levels up to 20 watts. The dashed line illustrates how to find the SWR.

have difficulty discerning a 3-dB change in signal level, and I have excellent hearing! Furthermore, the AGC (automatic gain control) in modern receivers is so effective that the human ear may not detect a signal-level change as great as 20 dB.

The situation is more serious at VHF and UHF, where the inherent dB losses in feed lines (generally referenced to 100 feet of line) increase as the operating frequency in MHz becomes higher. By comparison, the losses in 100 feet of RG-58 coax cable at 2 MHz are 1/2 dB, but they rise to 6 dB at 150 MHz. If we use a 100-watt transmitter signal as a reference at 150 MHz, in a system with 100 feet of RG-58 coax, there will be only 25 watts of power that reach the antenna feed point, even with an ideal SWR of 1:1.

These dreadful losses can be reduced by using a more suitable feed line, such as RG-

8 with foam insulation. The losses drop to a more acceptable 2 dB per 100 feet of line at an SWR of 1:1. However, even with a 2-dB line loss we will sacrifice almost 1/2 the transmitter power in the feed line.

Shortwave listeners and experimenters often buy RG-58 line in preference to RG-8 coaxial cable, mainly because it is cheaper, more flexible, and less taxing for the dipole or other antenna to support. The worst coaxial line you can use is miniature RG-174—in the event you're tempted. The loss in 100 feet of that cable, even at 80 MHz, is an incredible 10 dB!

Those of you who monitor the VHF and UHF frequencies will fare much better with weak signals if the feeder is matched to the antenna feed point and the antenna is fed with a quality, low-loss line. The longer the feeder, the more important this becomes. Numerous matching systems for the antenna feed point, plus an in-depth explanation of SWR, is detailed in *The ARRL Antenna Book*.<sup>1</sup>

### ■ The Matched Condition

Amateurs have the advantage of being able to feed transmitter power to an antenna for the purpose of adjusting their antennas for an SWR of 1:1. Most ham stations are equipped with an RF wattmeter that also indicates the SWR. The nomographs in Figures 1 and 2 are useful when the wattmeter (such as a Bird brand) does not have an SWR scale on the meter. The nomographs require only the knowledge of what the forward and reflected powers are. A straight-edge is laid across those points on the chart (as shown by the dashed lines) and the SWR may be found on the SWR scale. The antenna matching section or element lengths can then be adjusted, and another reading taken. The procedure is repeated until the SWR is 1:1.

Those who are not licensed to use transmitters may utilize what is known as a "noise bridge" to adjust the match on antennas below 30 MHz. Commercial noise bridges are available.<sup>2</sup> Or, you may choose to build your own noise bridge from the plans given in *The ARRL Antenna Book*.

For those who are licensed, but do not own an SWR bridge, a fool-proof and easy-to-build unit is described in chapter 6, page 173, of *W1FB's Design Notebook*, (available from the ARRL, Inc.). No test equipment is needed to balance the bridge. You merely build it and use it!

### ■ Some Final Thoughts

I have avoided a scientific explanation of what SWR is, in an effort to preserve the sanity of our readers who are not technical wizards. In essence, SWR is the ratio of maximum voltage (or current) along the feed line to the minimum voltage. Either current or voltage may be used to reveal the SWR. In a like manner, SWR can be determined from knowledge of the forward and reflected powers, in watts, as indicated in Figures 1 and 2.

It is important to understand that a perfect match occurs only when the antenna feed point, for example, is purely resistive and of the same impedance as the feed line, i.e., a 52-ohm feed point and 52-ohm coaxial cable. The feed point usually exhibits what is known as reactance (capacitive or inductive:  $X_C$  or  $X_L$ , respectively). The matching system is designed to remove this unwanted component.

If the antenna is too short for the operating frequency, it exhibits a combination of resistive and reactive components; likewise, if it is too long. The short antenna adds  $X_C$  (capacitive reactance) and the long antenna presents  $X_L$  (inductive reactance). These components of reactance are also identified as  $-j$  (capacitive) and  $+j$  (inductive). The matching network cancels these reactances and makes the feed point purely resistive at the resonant frequency of the antenna (desirable).

Using an antenna tuner at the receiver or transmitter end of the circuit does not cure the mismatch problem at the antenna. It simply disguises the condition at the station end of the feed line, and the SWR remains at the feed point of the antenna.

The effort involved in matching the antenna to the feed line is worthwhile in the interest of minimizing signal losses. It also provides an interesting learning experience. A proper match, plus a low-loss feed line, will greatly enhance your weak-signal reception, especially on those days when propagation is poor.

Note 1—ARRL, 225 Main St, Newington, CT 06111; (203) 666-1541.

Note 2—Palomar Engineers, Box 462222, Escondido, CA 92046; (619) 747-3343.

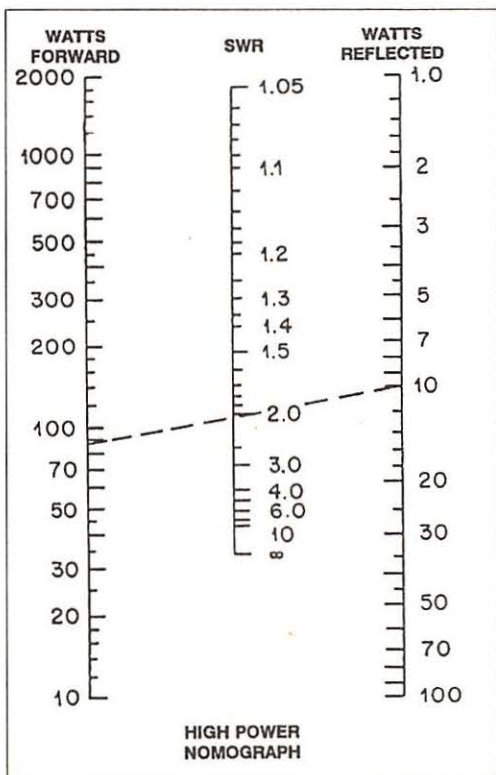


FIGURE 2: Nomograph for finding the SWR from known forward and reflected powers up to 2000 watts.

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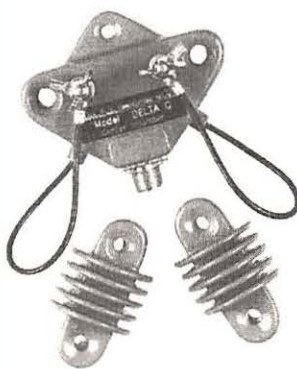
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# An Easy Datalogger for Shack and Shop

**M**y experience with automated data logging goes back to the 1970's when I performed air pollution and meteorological studies throughout the great American West for Environmental Impact Reports. The pristine West had come under close scrutiny where massive fossil-fuel fired power generation plants had sprung up wherever there were convenient sources of coal, oil, or natural gas. The federal government mandated data accumulation for the purpose of "before" and "after" comparisons of environmental factors to determine the effects of heavy industry on the virginal environment.

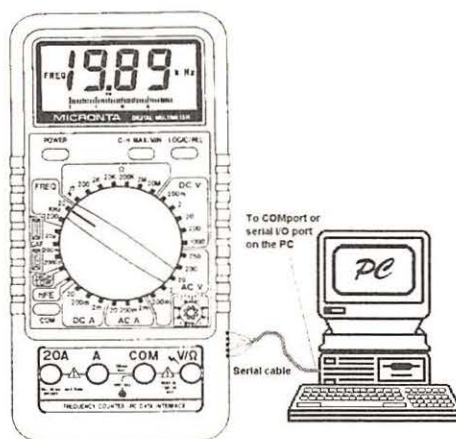
I am reminded of one experience near Rock Springs, Wyoming, at Pacific Power & Light's Jim Bridger Generating Station, a massive 2,000-megawatt coal-fired power plant. This region is just about as far from anywhere as you can get, and despite the emerging presence of the oil, gas, chemical, and power generation industries, the region was among the most pristine, undefiled areas I'd ever seen.

The government required PP&L to perform lengthy and detailed environmental studies to ensure minimal degradation of the environment. The required data ranged from concentration of particulates and chemical composition of the air, to weather parameters of temperature, humidity, sunlight, wind speed and direction, and moisture accumulation from rain and snow. The amount of data to be accumulated was incomprehensible, since most of it was to be collected around the clock for several years!

Specially equipped electronic monitoring sites were strategically placed at varying distances from the power plant, some within a few hundred yards, and some as far away as 25 miles. You think we stationed people in this region to acquire and process the data? Good grief, no! It was automated with landline and radio telemetry, not to mention in-situ storage on 9-track 1/2" magnetic tape.

Monitoring and data acquisition projects like this one were common throughout the West in those days, typically with anywhere from three to twenty sites per project. Can you imagine the cost, at about \$100,000 per site in 1970's money? I cringe to think of what could be today's cost had not technology kept pace to provide better electronics at

## SIMPLE DATALOGGER For Shack & Shop



ever-lower costs. Today, a few hundred dollars can do what \$50,000 couldn't do in those days. What's more, that technology is now available to the casual hobbyist, technician, and professional for myriads of applications around shack and shop.

One magnificent example is Radio Shack's digital multimeter with **PC Interface** and a 20 MHz frequency counter, cat no 22-168 (page 118, 1995 Catalog). (#22-182 was its predecessor in 1994.) Wow! For \$129.95, you get not only a high class digital volt-ohm-milliammeter, but also a frequency counter good to 20 MHz, and best of all, it can be operated as an automated data logger with a simple connection to any IBM/PC compatible computer, from an XT/AT through the modern Pentium. Let me put it to you this way: a \$130 multimeter and an old junked \$200 XT can do more and better than \$5,000 worth of comparable instruments twenty years ago!

### ■ Picture the Applications

Let's briefly see what constitutes a datalogger. YOU would be a datalogger if you were to connect a voltmeter to something and write down the voltage reading every minute on the minute. YOU would be a datalogger if you were a security guard making the rounds, checking for and annotating the status of locked doors and windows at periodic intervals. You would be a datalogger if you were to measure and record temperature and humidity every five minutes. Getting the idea now?

A voltmeter is a voltmeter, but Radio Shack's #22-168 (and 22-182) is so much more, because of its ability to communicate with and be controlled by a personal computer. In fact, it comes with the necessary cable to fit a serial port of most IBM/PC-compatible computers ever made. Also included is the necessary software to weld computer and meter into a very powerful data acquisition system that's capable of automatically measuring and logging voltage, resistance, current, capacitance, frequency, and even the gain of bipolar transistors! The computer writes to a simple ASCII text file whatever data at whatever measurement interval you choose, for a permanent record of "events": qualities or quantities that might be represented by the measured parameters.

For example, the #22-168 or 22-182, set to the proper voltage scale, can be connected to the squelch circuit of a receiver. This will produce a log of squelch breaks that might later be synchronized to a simultaneous tape recording while you've been away. You could use the A/C voltage function to produce a 24-hr log of line voltage measurements to show how they're not treating you right. A cadmium-sulfide cell (276-1657) connected to the ohmmeter can be used to record variations of light—either sunlight through the course of day and night, or as a detector for infrared-triggered flood lights at night. (*I see the heart and soul of a sophisticated security system here, don't you?*)

A thermistor connected to the ohmmeter can be a temperature sensor. The bench technician troubleshooting an intermittent voltage variation in a power supply or other circuit can connect this meter for unattended recording of desired voltages while he busies himself with other productive work. If there is a periodicity to the voltage fluctuations, this could be a clue to the necessary remedial measures.

In short, the #22-168 or #22-182 can be connected to almost any kind of a sensor, transducer, detector, or other signal source, to serve as a hands-off, automatic data recorder or datalogger. The applications are limited only by the imagination! Think of it this way: whatever you would do with a voltmeter, ammeter/milliammeter, ohmmeter, capacitor meter, and/or frequency counter can now be

controlled by a low-cost computer that was otherwise ready for the junkyard. Accumulated data is written to the ASCII text file and saved on the hard disk or floppy disk as desired.

You might ask what can later be done with the text file of data. Process it, of course! An ASCII text file is easily reformatted into the type of file suited for exporting into a database manager program such as dBase III, IV, Microsoft ACCESS, FoxPro, Approach, Paradox, FileExpress, PC-File, Q&A, or any of the many others. The best universal format for export to most all database managers is a *comma-delimited ASCII text file*. Database managers make quick work of data processing for human evaluation and interpretation of the results.

My daughter did a winning Science Fair study of electrical parameters in living plants. She took data for months on end and then correlated that data to variables of light, temperature, and moisture. This would have been an impossible task for a teenager if it weren't for a computer and a database manager to make quick work of the organization and presentation of the data.

The aforementioned comma-delimited ASCII text file is not produced by the program that comes with Radio Shack's **PC-Interface Meters**, but the output file can be manually reprocessed with a text editor of choice (*I like QEDIT*). If you're lazy...like I am...and want it all, you are welcome to download from my *Hertzian Intercept BBS* a revised version of the meter program that will generate the comma delimited file, hands off! My dear friend and associate, Brian Greer of Los Angeles, did the necessary revisions to the open source code and made it freely available, and it works with either meter. The revised PC-Interface control program, named **RSMETER.ZIP** (about 50-kb) is available in the free file section. **RSMETER.ZIP** also contains an icon, a PIF file, and a batch file to facilitate running the data logging program from Windows™. Of course, it's a natural to run from MS-DOS as well.

The *Hertzian Intercept BBS* (619-578-9247) is open from 5:30pm to 1:30pm, PDT, weekdays, and 24 hrs, weekends. The BBS is closed between 1:30pm-5:30pm, weekdays, so please don't call then. To log onto the *Hertzian Intercept BBS*, set your terminal program for TTY or ANSI emulation, and 8 data bits, No parity, 1 stop bit (8N1). Acceptable modem speeds are from 1200-bps to 28,800-bps.

#### ■ PC-Interface Software

Radio Shack's newest 22-168 comes with

a fantastic Windows™ datalogging and scope program that beats anything I've ever seen for ten times the cost. Utterly awesome is that this program is backwards compatible with the older 22-182 meter, too! I don't know how or if you can get the upgrade program for the older meter, but a call to Radio Shack might be in order. Either way, the important thing in datalogging is to record accurate values with notations of the time that values were measured. Either program gets the job done, and the meter takes care of the accuracy. Now let's polish off with some real world applications for a datalogger in your shop or shack.

How about a propagation analyzer? You can get propagation charts right here in *MT* and other shortwave literature, but are they accurate? Well, yes....if everything meets the spec under which the charts were produced, but who can control the weather and other variables from one locale to the next? You might want to do your own propagation studies. It's easy with Radio Shack's PC-Interface meter. Just connect the meter to the shortwave receiver's S-meter circuit. Tune the receiver to a world class station on a frequency of interest. Turn the volume down so you're not bothered by the static. Then set up the Interface program to log S-Meter data at periodic intervals, say once or twice a minute. Ensure things are working, and then go on about your business for the next 24 to 72 hours. When you return, you'll find a massive data file awaiting your most exacting or cursory analysis.

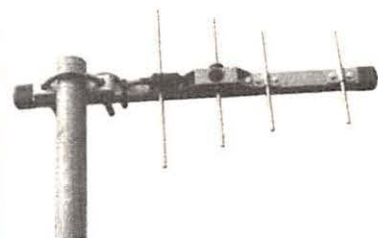
How about a channel traffic analysis? Sure; connect the meter to a scanner's Squelch Gate, and set the display for a VHF-UHF frequency of interest. Run the program ... and come back 24-72 hours later to find a great database that can be assessed for traffic volume and density.

If you take this business of datalogging and data processing seriously, the output file can be dropped into a spreadsheet with a  $Y = mX + b$  equation to convert raw data into meaningful information. If you don't know what I mean, relax ... Radio Shack's PC-Interface Meter still offers boatloads of opportunity for the greenest neophyte as well as the saltiest expert.

Once you get started, you'll find one door after another opening for you, and who knows where it could lead? The smallest thing sometimes turns out to be a crossroad of life. Thirty-seven years ago, I got a new-fangled transistor radio for my 12th birthday. It changed my life. Last year I gave my daughter one of these PC Interface meters for her 16th birthday ...

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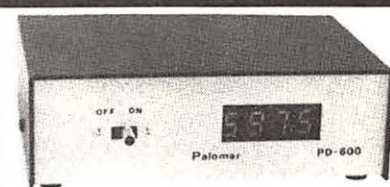
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## Selecting an Antenna, Part 3

**T**his month we conclude our discussion of several important antenna characteristics and how they affect the selection of appropriate antennas for various applications on different bands. Fortunately, what we say here about antenna gain, directivity, polarization, and so forth applies equally well to transmitting antennas, and so the following discussion should help you select antennas for transmit-receive applications as well as for receive-only uses, such as short-wave listening, general monitoring, or scanning.

### Factors in Antenna Selection

**VERTICAL DIRECTIVITY:** Reception of local and nearby stations on any frequency presents our receiving antennas with signals arriving at low vertical angles, relatively parallel to the ground. Vertical antennas in general, and horizontal antennas mounted 1/2 wavelength or more above the ground, give us at least a modest amount of such low-angle responsiveness.

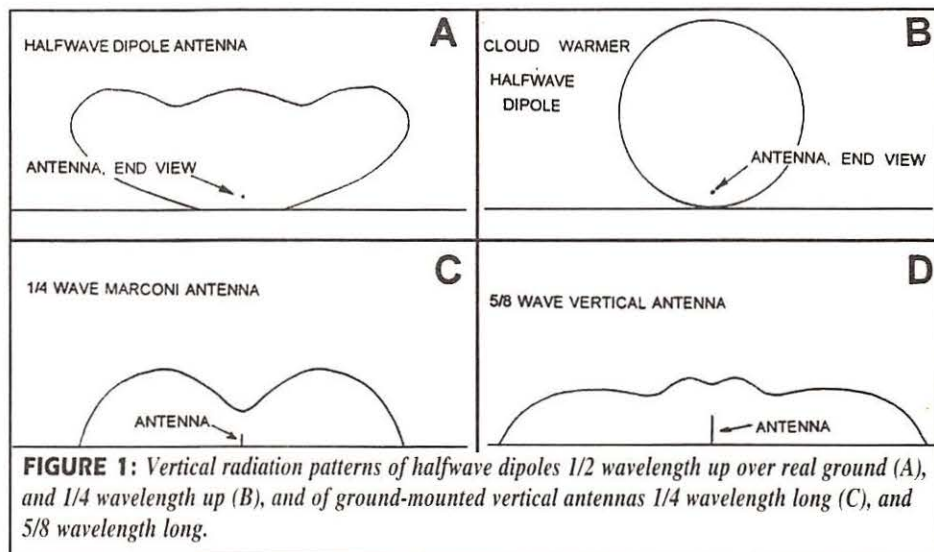
Increased low-angle vertical response is obtained with the 1/2 wavelength groundplane, more so with the 5/8 wavelength groundplane, and even more with the higher gain coaxial collinear versions.

HF signals from very distant stations, thousands of miles away, tend to arrive at moderate to low vertical angles, and so vertical antennas are also desirable for HF DX work. Phased-array beams are excellent low-angle HF DX antennas. Yagi beams and quad beams mounted 1/2 wavelength or more above electrical ground produce reasonable amounts of low-angle directivity.

For close-in work where direct-path communication is blocked by mountains, low-angle radiation is not effective. In this case antennas such as horizontal halfwave dipoles and horizontal fullwave loops mounted 1/10 to 1/4 wavelength above electrical ground can be used as upward pointing beams.

These so-called "cloud warmers" send signals straight up to the ionosphere from which the signals "rain" back down on the surrounding areas. This technique is useful from about 4 to 8 MHz in daytime, and from perhaps 2 to 4 MHz at night. A counterpoise under such an antenna can help considerably where soil conductivity is poor.

**HORIZONTAL DIRECTIVITY:** For



**FIGURE 1:** Vertical radiation patterns of halfwave dipoles 1/2 wavelength up over real ground (A), and 1/4 wavelength up (B), and of ground-mounted vertical antennas 1/4 wavelength long (C), and 5/8 wavelength long.

nondirectional reception on any frequency, antennas with a single vertical radiator are good; these include the various groundplane designs and the Marconi grounded verticals. Halfwave dipoles can also be mounted vertically for nondirectional coverage. In terms of antenna-element length this is more practical at VHF and higher frequencies than it is at HF and lower frequencies.

The directivity pattern of a *horizontally* mounted halfwave dipole antenna is virtually nondirectional; the nulls off each end are quite narrow, even somewhat filled-in for practical antennas over real earth. The horizontal halfwave dipole's close cousin, the inverted-V antenna, and the horizontal fullwave loop antenna, are both useful where a nondirectional HF antenna is needed.

For directional work most beam antenna designs give fair to high gain by directing their responsiveness primarily to the compass direction of their beam. This directivity also reduces responsiveness to offbeam signals and noise, thereby improving the signal-to-noise ratio of received signals; this aspect is especially useful on the HF and MF band.

**WEAK SIGNAL WORK:** Beam antennas are a frequent choice for weak signal work due to their ability to reduce offbeam noise and also give high levels of gain as just mentioned. The Yagi, quad, and L-P arrays are the most popular beam designs from around the middle of the HF band and higher in frequency; on the lower frequencies of the HF band vertical-element phased-array beams

are useful. With beams, interference or noise can sometimes be placed in a null, improving weak-signal reception.

An HF beam's ability to reduce offbeam received noise and offbeam interference is its most valuable asset in weak signal work. However, at VHF and higher frequencies, where received noise is quite low, the gain realized by the higher-gain groundplanes can be of considerable help in weak-signal reception by bringing signal levels above receiver-generated noise levels.

**POLARIZATION:** In considering polarization keep in mind that many antenna designs can be mounted to attain either vertical or horizontal polarization. On the HF bands we find both vertically and horizontally polarized antennas in wide use; horizontal polarization for close-in and medium distance work and vertical polarization for DX. Horizontal wire antennas mounted at least a half wavelength above electrical ground give good DX service, and horizontal HF beams at similar heights are excellent for DX.

For work at VHF and higher frequencies, vertical polarization is almost universally used. Exceptions to this are the use of circular polarization in satellite reception to compensate for the constantly varying polarization of received signals, and of horizontal polarization for TV broadcasts.

For LF and lower frequencies, vertical polarization is usually the only effective polarization.

**BANDWIDTH:** For use over a few, very closely-spaced frequencies, the bandwidth of an ordinary wire antenna, such as a halfwave dipole or quarterwave groundplane, is usually satisfactory. When desired signals are spread over a wide bandwidth—more than around five percent or so of the antenna's design frequency—then we begin to think about broadband or wideband designs such as the V-beam, rhombic beam, LP-array and discone.

Properly designed, these antennas can cover many different bands and become true multiband antennas. Multiband trap designs are also popular; however, due to the dependence of HF reception on signal-to-received-noise ratio, their primary value on HF is in transmitting applications. This same dependence on signal-to-received-noise factor makes effort to attain broadbandedness in HF receive-only antennas of questionable value.

#### ■ Selecting an Antenna For Your Needs

In selecting an antenna it is useful to determine how the factors discussed above apply to your particular application, then note the antenna types suggested as providing those factors. Selection among the suggested types is then often based on cost or ease of construction and/or installation of the designs involved. Many suppliers who advertise in *Monitoring Times* offer a variety of antennas for sale.

If you missed the first two columns in this "Selecting an Antenna" series reprints are available from *Monitoring Times* for \$2 each. For more information on antenna characteristics, differences between antenna types, antenna plans, and a variety of other useful antenna information check out my *Antenna Handbook: A Guide to Understanding and Designing Antenna Systems*, available for \$12.95 plus \$2.50 book-rate postage (or \$5.50 UPS) from Grove Enterprises, P.O. Box 98, Brasstown, NC, 28902; or 800-438-8155 for credit card orders.

## RADIO RIDDLES

#### ■ Last Month:

Last month I gave you the following statement, taken from *TV and Other Receiving Antennas*, by Arnold B. Bailey (1950, John F. Rider Publishers, New York): "If it were not for the presence of radio noise, the useful radio paths expressed in miles would have no limit. Furthermore, if it were not for radio noise being present in all radio circuits, the magnitude of the transmitter power would be of no great consequence, and there would be no necessity for using large values of power."

I then presumptuously asked you if you found fault with the statement; I hope that you didn't, because I can't! We receive signals as long as they are sufficient in strength to be heard over receiver-generated noise, noises received by the antenna (terrestrial static, cosmic static, man-made electrical noise), and noise generated in the antenna and transmission line.

Noise is a very significant limiting factor in radio communications, and the more clearly we understand its presence, the more effectively we can design and utilize our communication systems.

#### ■ This Month:

Did you know that there are antennas called "mute antennas," "dummy antennas," "phantom antennas," and "artificial antennas?" and that they are used to test a transmitter or receiver when we want none of the transmitter's signal power transmitted nor off-the-air signals received by the receiver? We'll say a bit more about these antennas next month as we answer the question: "Do we also have 'mute, dummy, phantom and artificial grounds' available?"

Till then, Peace, DX, and 73.

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Reviewed by Larry Miller in April '93

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**Q.** Here in the Seattle area, old VHF/UHF frequency usage is mixed with the new trunking system. I have also heard police communications in the cellular 830-832 MHz range; is this some sort of frequency tradeout with the cellular industry? Is it in use for similar purposes in other parts of the country? (Name Withheld, West Seattle, WA)

**A.** In the United States, 825-849 MHz (mobile) and 869-894 MHz (base) are exclusively allocated for the cellular mobile telephone service. There are no exceptions. If you hear law enforcement conversations taking place anywhere in this range, it is on a cellular telephone. The only other possibility would be that you are hearing an image or intermod product from strong-signal overload of your scanner.

**Q.** Our local public safety agencies are now using trunking systems in the 856-858 MHz range. Occa-

sionally, however, I hear cellular telephone calls in that same range, and a loud "buzzing" signal which changes frequencies every day. Is that a jammer? Data transmission? What's going on? (Paul Ebert, Oak Ridge, IN)

**A.** It's not cellular, it's more trunking: the Specialized Mobile Radio Service (SMR). These are small, local companies who provide two-way radio service, including mobile telephone capability, to a variety of commercial users.

The raucous buzzing sound you hear is data, all right, but it is used to coordinate "hand-offs"—automatic channel switching among the users of the system. Cellular systems have similar control channels.

**Q.** Occasionally, while listening to shortwave, I will hear a whistle sweep through. What are these signals and how far away are they? (Jack Belck, Glen Carbon, IL)

**A.** These "ionosondes" are used to check long-distance propagation for selecting the best routes and frequencies for communications at that time of day. Depending upon the particular agency doing the transmitting, these signals may emanate from several hundred to several thousand miles away.

**Q.** Older CB sets have two crystals, one for transmit and one for receiver. Since they are for the same channel, why aren't they on the same frequency? (Heather Peel, Oakville, ONT)

**A.** Let's take a look at the simplest radio using single conversion for the receiver. The transmit crystal frequency is typically multiplied by three, then amplified to five watts so that it can provide enough signal to be radiated from the antenna. For example, if you were talking on CB channel 19 (27.185 MHz), the fundamental crystal frequency would be 9.0617 MHz, then tripled.

The receive crystal, however, controls the

## Bob's Tips of the Month

### Finger-Spin Tuning for the PRO-2035

Radio Shack's recently-released PRO-2035 desktop scanner is enjoying a well-deserved success, but many users wish that the shallow tuning knob were more maneuverable. Jerry Davidson of Pennsauken, New Jersey, has come up with a fix.

At a local auto parts store, Jerry found an inexpensive O-ring, 1-1/8 inches inside diameter. Slipping the O-ring over the knob, Jerry now easily spins the tuning dial with his finger on the rim.

We tried the simple enhancement on one of our stock PRO-

2035s and it worked impressively. The knob not only spun easily with slight index-finger pressure for rapid frequency slewing, but it gripped better and the increased diameter gave it a more positive feel.

Purists who object to the rubber ring might be able to locate a 1/4-inch-wide VCR belt of the same diameter.

Thanks for the handy hint, Jerry!

### Testing the Sony ICF-2010 for RF Burnout

Several years ago, when the popular Sony ICF-2010 portable shortwave receiver was first introduced, a number of customers complained of sudden drops in sensitivity; tests showed that the cause was catastrophic failure of the RF preamplifier transistor, most probably a victim of static electricity, and most likely occurring when an external antenna was plugged into the jack. The problem was addressed by the factory and such reports have virtually ceased.

Readers still query us, however, on how to tell whether their 2010s might be similarly affected. This simple procedure should reassure you that all is well.

First, with the whip fully extended and preferably during daylight hours when signals are strong, tune through the 11.6-12 MHz range; there should be several strong signals forcing the signal-strength light bar into its high region of illumination. At night, try this in the 7-7.4 and 9.5-9.8 MHz ranges.

Next, collapse the whip to minimum length and tune in exactly 1620.0 kHz; note the noise level in the background. Now tune slightly higher in frequency; there should be a pronounced drop in background noise as the circuit automatically selects a different amplifier/antenna combination.

If both of these tests yield results as described, chances are the amplifier stages are working properly.

receiver oscillator; its frequency is mixed with the incoming signal frequency to produce an intermediate frequency (IF) like 455 kHz.

Since we are hearing 27.185 MHz, the receiver oscillator must provide 27.640 MHz (27.640 MHz - 27.185 MHz = 455 kHz). That oscillator crystal also is typically multiplied by three, so its fundamental frequency would be 9.213 MHz.

Questions or tips sent to "Ask Bob," c/o MT, are printed in this column as space permits. If you desire a prompt, personal reply, mail your questions along with a self-addressed stamped envelope (no telephone calls, please) in care of MT.



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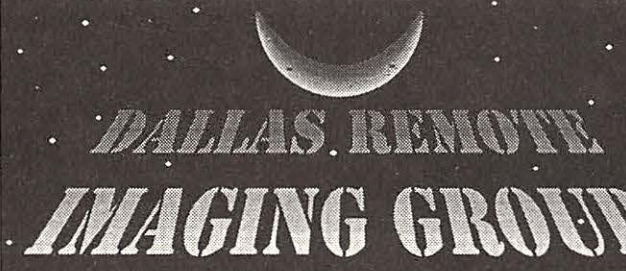
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(Continued from page 4)

"Dumpster Dog") of Chicago, IL, was inspired to add some additional advice: "when scrounging up parts for projects, *one should not overlook one's current place of employment*. Several years ago I used to work for a division of a huge corporation which manufactured extremely large mainframe computer systems and telephone communications equipment. This company had a habit of scrapping excess and 'obsolete' inventory. During the course of my employment I was able to retrieve from the dumpsters: *miles* of coax, *hundreds* of feet of computer data cable, telephone wire, miscellaneous electrical wire, every type of connector you can imagine for all of the above wire and coax, power supplies, various switches, fuse holders, fuses, box fans, an entire equipment rack with power supply and ventilation fans, a DEC CPM 86/80 computer with enough spare parts and software to build two more computers and still have parts left over, a DEC VT220 terminal and modem, ... I could go on and on.

"I literally had my own Radio Shack store in my apartment. Actually, I had four rooms filled floor to ceiling with boxes of electrical parts.

"The most important part of this type of parts scrounging is: ALWAYS get your supervisor's permission before you go diving into the dumpsters, and ALWAYS get permission (written if possible) to take anything out of the dumpster and put it in your car. And lastly, ALWAYS do it on your own time, not the company's; a few missed lunch breaks or coming in an hour early each day could be very rewarding."

## Scan, but Stay at Home

■ Here are some words of wisdom from John Griffin, KB2SGJ, of Hillsdale, NJ, regarding "scanner etiquette."

"Congratulations to Louis Shirley for his well-written and informative article, 'Recollections of the Big Blast,' in the March issue of *MT*. However, by his own account, Mr. Shirley committed a *mortal sin* amongst scanner monitors by attempting to drive to the scene of the explosion. He and all of the other hundreds of curious onlookers were respon-

sible for contributing to the traffic mayhem that prevailed following the blast.

"Living only five miles from the site of the disaster should have provided any scanner listener with lots of info using only a tabletop receiver and a telescoping whip antenna. Serious monitors are usually adequately equipped for the task utilizing multiple scanners, outdoor hi-gain antennas and preamplifiers. The point is that with the proper advanced planning, almost any event can and should be monitored from the comfort and privacy of your own home."

This unspoken code of scanning behavior has been learned the hard way by hobbyists who were too eager to become part of the action, and thereby gained an undesirable reputation for the hobby in the eyes of officials and the public alike. I agree with John Griffin: unless you have reason to be there, stay at home and view the events on your television screen while you monitor "what's really happening" on your radios.

## Warm Thanks to WA3NAN

■ I hope you have been making good use of the March feature on SAREX (Shuttle Amateur Radio Experiment). You should be; six out of seven crew members on the recent *Endeavor* mission had ham licenses. For future

SAREX missions, especially the Shuttle-Mir expedition, however, there will be substantial frequency changes. For a full run-down, see the May/June *Satellite Times* cover story, "Shuttling to the Mir."

Exciting as direct contacts may be, an even greater number of listeners tune in to the Shuttle rebroadcasts aired by WA3NAN, the Goddard Amateur Radio Club.

The club first started rebroadcasts in November 1983. The rebroadcasts are a project of about twenty members of the hundred-member club. The club receives no funding from NASA: only the electric power and the facility. Last year Ron Bruckman of the Radio Monitors of Maryland club was given a tour of the HF shack by Charles Sommer N4SOD. Here are some details regarding the WA3NAN operation.

HF rigs:	Collins KWM2-A
VHF rigs:	GE models
Antennas:	VHF 1cople and phased array HF dipoles for 80-40-20 meters
Output:	500 to 1000 watts
Freqs:	147.450 MHz 3860 7185 14295 21390 28650 kHz

Back in the 1970's, before WWV moved to Colorado, the poles that support WA3NAN's dipoles also supported WWV's antennas! A new facility, which should now be completed, will combine all equipment—at the time of this picture, the HF and VHF equipment were actually housed in different trailers.

Thanks, WA3NAN, for the many hours of enjoyable listening you have provided for hams and shuttle buffs over the years.

## From the Editor

■ Spring comes with a burst of energy and a desire to either dig in the dirt or mess about on the roof. Sadly, though, in many parts of our world spring means the resumption of on-going hostilities.

Although we monitors like to use the phrase, "Lighten up; it's just a hobby!" you and I know that both *is*, and *isn't*, true. We each can make a difference. Whether your hobby is local or global, isn't there some wisdom, wonder, or just plain fun you could share with others from your radio monitoring times?

—Rachel Baughn,  
Editor



Photo by Ron Bruckman

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**Worldwide Ute News:** Rick Baker, ae4111@yfn.ysu.edu for info - worldwide membership; non-broadcast under 30 MHz. Free electronic newsletter WUNNEWS, join by sending e-mail to majordomo@phoque.info.uqam.ca with following in e-mail message: "subscribe wunnews." Through World Wide Web: <http://sun-gabriel.aero.org:8800/>. For paper version: \$14.50/yr to Tim Braun, 15915 Smithy Dr., Haymarket, VA 22069.

## Let's Start a Club:

Scanner listeners in the Pittsburgh, PA, area who are interested in being part of a pager scanner club, please contact Jeff McKinzie N3TAY, at 1000-4th St, East McKeesport, PA 15035, or phone at (412) 824-4318 or pager (412) 649-2545. All scanner bands covered.

**All Ohio Scanner Club:** Dave Marshall, 50 Villa Rd., Springfield, OH 45503-1036. U.S. northeast of the Mississippi; VHF/UHF/HF utilities. Net Mon 9:30pm 146.940. *American Scannergram*. \$18 U.S., \$21 Can/Mex, \$28 ww. \$3 sample. Annual summer meeting.

**American SW Listener's Club:** Stewart MacKenzie, WDX6AA, 16182 Ballad Lane, Huntington Beach, CA 92649, (714) 846-1685. Western US, Pacific, Asia, SWBC, utilities, longwave, clandestine. SWL \$20 US, \$22 Can/Mex. \$1 sample (\$2 ww). Meets 1st Sats 10am address above.

## Listeners' Nets

You are invited to post your North American amateur radio net in this bi-monthly listing if its primary emphasis is devoted to the radio monitoring hobby (not amateur radio).

### Capitol Hill Monitors

146.91 MHz 1st & 3rd Mon 7:30pm ET, DC, Md, N.Va, S.Del; Scanning and amateur radio Frequency Forum BBS 703-207-9622 [8-N-1] Net Mgr: N3RDC, John Korman Call Alan Henney 301-270-2531 or John Korman 301-299-5455 for info Newsletter \$8; 6912 Prince George's Ave, Takoma Park, MD 20912-5414

### Central Florida Listeners Group

146.730 MHz, Sun 8pm ET, Central Florida; any radio communications outside amateur bands Net Mgr: N4EF

Telephone gateways announced; CFLG BBS conference on LASER BBS 407-647-0031 Call Mark Kuziv, KC4ZVK, 407-933-7163 for info

### Larkfield's ARC SW-Scanner Net

147.210 MHz, Fri 8pm ET, Long Island, NYC, NJ, Conn; Shortwave BCers & utes, MW, amateur radio, scanning

Net Mgr: Hank Lukas, N2GCN

Open to all amateurs on air; by letter for scanner listeners

Contact: P.O.Box 115, Plainview, NY 11803-0115

### Montreal DX Listeners Net

146.910 MHz, Sun 8:15 pm ET, Montreal PQ area; MW SW, & Scanner

Net Mgr: Sheldon Harvey VE2SHW

Telephone gateways announced

### Monitoring the Long Island Sounds Net

146.805 Tues 8pm ET, Long Island, NY; Primarily scanning

Net Mgr: WB2RVA, 2134 Decker Ave, North Merrick, NY 11566

### Monix SW and Scanner Listeners Info Net

146.835 MHz, Thurs. 9:30 pm ET; Cincinnati/Tri-State Area; All band

Net Mgr: Mark Meece, N8ICW, (513) 777-2909 (no collect calls)

Open to all amateurs; Telephone gateways to

**Association of Clandestine Enthusiasts (A.C.E.):** Kirk Baxter, P.O. Box 11201, Shawnee Mission, KS 66207. US, Europe and Middle East; Pirate and clandestine. *The A.C.E.* \$18 US, \$19 Can/Mex, \$25 ww.

### Association of Manitoba DX'ers (AMANDX):

Shawn Axelrod, 30 Becontree Bay, Winnipeg, Manitoba, R2N 2X9 Canada, (204) 253-8644. Manitoba; LW, MW, SW, and VHF/UHF. Meets monthly. \$2.

**Bay Area Scanner Enthusiasts:** Bruce Ames, P.A.O., 105 Serra Way #363, Milpitas, CA 95035, (408)267-3244. Western U.S.; 25+ MHz. *Listening Post* (bi-monthly). Meets 2nd Mons. 7:30 Milpitas Police Admin Bldg. \$25 US, \$2 sample, or SASE for info.

**Bayonne Emergency Radio Network (BERN):** Ray Baron/Bob Frasca, P.O. Box 1203, Bayonne, NJ 07002-6203, 1-800-286-2876. Metro NJ, NY; Fire/disaster, pub safety.

**Bearcat Radio Club:** Larry Miller, Box 360, Wagontown, PA 19376, 1-800-423-1331. National. Scanning only. *National Scanning Report* (bi-monthly). \$17.50 or \$29.90, \$5 more Can. \$3 sample.

**Boston Area DXers:** Paul Graveline, 9 Stirling St., Andover, MA 01810-1408, (508)470-1971, 50 mile radius Boston; 3-30 MHz. Meets 3rd Fri 7:30pm, The Lexington Club, Rte 4/225 1/4 mi W of Rte 128.

**British Columbia Shortwave Listening Club (BCDX):** Box 500, 2245 Eton St., Vancouver, BC Canada V5L 1C9, (604) 255-9897 fax. Shortwave. *LOGJAM*, Meets 3rd Thurs. 7pm at 920 Davie St.

**Canadian Int'l DX Club:** Sheldon Harvey, 79 Kippis

net mgr up to 1/2 hr before net; The Listening Post BBS (513) 474-3719

### New York DX Association

146.880 Mon 9pm ET, NYC area; "DC to Light" Net Mgr: Charles Hargrove N2NOV, 723 Port Richmond Avenue, Staten Island, NY 10302-1736 Voice mail 1/2 hr before net: 212-978-3375; Compuserve 73167,312

**Northeast SW Listeners and Scanners Net;** Rip Van Winkle Society

147.21 MHz (WB2UEB) Wed 8pm, Albany, NY, area.

Net Mgr: Ray Loeper N2RAD

### Ontario DX Association - Listeners Net

VA3ODX rpt, 442.375 (+) (103.5 Hz CTCSS tone); Sundays 8:30 pm ET; Toronto area coverage; LW, MW, SW, FM, VHF/UHF topics discussed; Open to all. Rptr used daily by ODXA members.

Net Mgr: Stephen Canney, VA3ID

### Rocky Mountain Monitoring Net

147.225, 224.980 Denver; 145.460 Boulder; 145.160 Colorado Springs Sun 20:00; communications monitoring

Brian Gould, KB0MEP, Mt. News Net

**Shortwave Listeners Net,** Association of North American Radio Clubs

7.240 MHz LSB, Sun 10am ET, Eastern US;

Shortwave broadcasts and utilities

Net Mgr: KW3F, 238 Cricklewood Circle, Lansdale, PA 19446

Telephone gateways announced

**Southern Wisconsin SW Listeners Net; MARA** 147.150 MHz, alt 146.760 MHz. Madison, WI, area

First Sun 8pm CT. Shortwave, scanning, dc to daylight, equipment notes and comments.

Net Mgrs: N9LTD, KA9SRU, N9EWO

Contact: N9EWO, Dave Zantow, 1609 Ontario Drive, Janesville, WI 53545

St., Greenfield Park., Quebec, Canada J4V 3B1, (514)462-1459. Canada nationwide/membership open to all; General coverage. *The Messenger*. \$26 Can, \$25 US, \$US28 or \$Can35 ww. \$2 sample. Meets 2nd Tues 7pm Montreal; several annual events.

**Capitol Hill Monitors:** Alan Henney, 6912 Prince Georges Ave, Takoma Park, MD 20912-5414, (301) 270-2531/5774 fax. DC, MD, No.VA, So.DE. Scanner bands. Frequency Forum BBS 703-207-9622 (8-N-1) Net 1st & 3rd Mons 7:30pm 146.91. *Capitol Hill Monitor*. \$8. Meets irregularly.

**Central Florida Listeners Group:** David Grubbs N4EF, 956 Woodrose Court, Altamonte Springs, FL 32714-1261; (407) 296-2055 Andy Fountain. Central Florida; All bands. Net on 146.73 MHz Sun 8 pm. Meets 2nd Sats 12 noon. Conf#10 on Laser BBS (407)647-0031.

**Central Indiana Shortwave Club:** Steve Hammer, 2517 E. DePauw Road, Indianapolis, IN 46227-4404. Central Indiana; SW broadcasting, pirates, and the offbeat. *Shortwave Oddities*.

**Central VA Radio Enthusiasts:** Richard Rowland, POB 34832, Richmond, VA 23234-0832. Metro Richmond and vicinity. VHF/UHF. SASE. No newsletter, no dues. Meets quarterly in Richmond.

**Chicago Area DX Club:** Edward G. Stroh, 53 Arrowhead Dr., Thornton, IL 60476. 300 mile radius of Chicago; DXing all bands. *DX Chicago*. \$17, \$1 sample. Meets irregularly.

**Chicago Area Radio Monitoring Association (CARMA):** Ted & Kim Moran, 6219 N. Greenview, Chicago, IL 60660-1815. Chicago & midwest. Public safety & general coverage. SCUG/CARMA BBS (708)852-1292. *CARMA Newsletter*. Meetings (Sats) and newsletter bi-monthly on alternate months.

**Colorado Shortwave Listeners Club:** Rob Harrington NONNI, P.O. Box 370593, Denver, CO 80237-0593, 303-756-9455. Longwave, shortwave. *Colorado Shortwave Listener* (4x) 35 cents each. Meets 1st Sundays.

**Communications Research Group:** Scott Miller, 122, Greenbriar Drive, Sun Prairie, WI 53590-1706. Wisconsin area. Scanning.

**DecalcoMania:** Paul Richards, P.O. Box 126, Lincroft, NJ 07738, (908)591-2522. Worldwide AM, FM and collecting radio related items. *DecalcoMania*. \$10 US, \$11 Can/Mex, \$16 Eur, \$17.50 Asia/Pac.

**Drake SPR4 Int'l Club:** Bill Swiger, Route 1, Box 142A, Bridgeport, WV 26330. Worldwide; Drake SPR4 owners.

**Fire Net:** Tom Kravitz, Box 1307, Culver City, CA 90232, 310-838-1436, internet mpag@netcom.com. All of California; fire, EMS, tied in with nationwide notification net.

**Global DX Club:** David Williams, P.O. Box 1176, Pinson, AL 35126-1176; Internet: XYVD51A@Prodigy.Com. Worldwide; all bands. *Radio Waves* (bi-monthly). \$1 sample. Meets monthly.

**Houston Area Scanners & Monitoring Club:** Glen Dingley, 909 Michael, Alvin, TX 77511, (713) 388-1941. 75 mile radius of Houston, TX; scanning & SW. Paging network. *HASMC Newsletter*. Meets Jan & June.

**Hudson Valley Monitors Association (HVMA):** Patrick Libretti, P.O. Box 706, Highland, NY 12528. Mid-Hudson valley and surrounding counties; VHF/UHF, public safety. *The Hudson Valley Monitor*. **International 11 Meter Alliance:** Allen Newton, Rt. 1 Box 187-A, Whitney, TX 76692, (817) 694-4047. Public safety, traffic handling, all bands, esp. 11 meters.

**Int'l Radio Club of America (IRCA):** Ralph Sanserino, P.O. Box 1831, Perris, CA 92572-1831. Worldwide; BCB/AM DX. *DX Monitor* (34 x) \$25 US, \$27 Can/Mex, \$28.50 ww. \$29 or 2 IRCs sample.

**Longwave Club of America:** Bill Oliver, 45 Wildflower Rd., Levittown, PA 19057, (215) 945-0543. Worldwide; Longwave only. *The Lowdown*. \$18 US, \$19 Can/Mex, \$26 ww.

## SPECIAL EVENT CALENDAR

Date	Location	Club/Contact Person
May 5-7	Cerritos, CA	West Coast VHF/UHF Conference / Gracie Hastings KK6CG, 854 Bernard Dr, Fullerton, CA 92635 714-990-9203
May 5-7	Baton Rouge, LA	Louisiana State Convention / Herb Ramey KB5AQ, 7310 Airline Hwy, Baton Rouge, LA 70805, 504-654-6087
May 6	Russellville, AR	Arkansas River Valley AR Foundation / Jerry Wilkinson WB4ICV, 544 Richland Circle, Russellville, AR 72801, 501-968-7257
May 6	Cuyahoga Falls, OH	Nat'l Expo's Hamfest & Computer Show / Ronald Nelson, 30799 Pinetree Rd, #230, Cleveland, OH 44124, 216-292-7744
May 6	Klamath Falls, OR	Keno ARC / Tom Hamilton WD6EAW, PO Box 678, Keno, OR 97627, 503-883-2736
May 6	Greenville, SC	Blue Ridge ARS / John Chism ND4N, PO Box 6751, Greenville, SC 29606, 803-967-0000
May 6	Toronto, Canada	Ontario DX Association, 20th Anniversary Convention. Location: CBC Canadian Broadcast Center, Downtown Toronto. Gen. admission \$12 Can..
May 6	Amarillo, TX	Panhandle ARC / Guy Pigg WZ5C, PO Box 3842, Amarillo, TX 79116-3842, 806-372-8462
May 6	Cedarburg, WI	Ozaukee RC Swapfest, / Jerry Walker KB9IMH, W70 N1018 Hampton Ct., Cedarburg, WI 53012, 414-377-7468, Location: Circle-B Recreation Center, Hwy. 60 and Co. I, Talk-in 146.37/97 and 146.52. Admission \$3
May 6	Superior, WI	Arrowhead RAC / George Mead KA0BUM, 4152 Ugstad Rd, Duluth, MN 55811, 218-729-6882
May 6-7	Abilene, TX	West Texas Section Convention / Peggy Richard KA4UPA, 1442 Lakeside Dr, Abilene, TX 79602, 915-672-8889
May 7	Yonkers, NY	Metro 70cm Network / Otto Supliski WB2SLQ, 53 Hayward St, Yonkers, NY 10704, 914-969-1053
May 7	Wrightstown, PA	Warminster ARC / William Gorodetzer K3MFI, 25 Fawn Dr, Holland, PA 18966, 215-968-2504
May 12-13	S. Sioux City, NE	Iowa State Convention & Hamboree #17 / Dick Pitner W0FZO, 2931 Pierce St, Sioux City, IA 51104, 712-258-1520
May 13	Springhill, LA	North LA, South AR Hamfest / David Smith KF5BF, PO Box 812, Springhill, LA 71075, 318-539-9161. Civic Center, Talk-in 147.165, 146.730, Adm. \$3
May 13	Manitowoc, WI	Mancorad RC / Glenn De Baker AA9MT, 2244 Richmond Ave, Manitowoc, WI 54220, 414-684-7096
May 14	Wheaton, IL	Radiofest / GMRS of Illinois, Inc, 5715 Plymouth, Downers Grove, IL 60516, 708-760-7727. DuPage Co. Fairgrounds, talk-in 146.52 simplex, 462.600/467.600 PL 173.8, 8am-2pm, Admission \$5
May 14	Wheeling, WV	Triple States RAC / Ralph McDonough K8AN, Box 240, RR 1, Adena, OH 43901, 614-546-3930
May 14	Hagerstown, MD	Antietam Radio Association / Steve Blevins N3MVL, 21508 Leitersburg-Smithburg Rd, Hagerstown, MD 21742, 301-797-2767
May 14	Medina, OH	Medina 2 Meter Group / Clarence Miller WA8JLA, 620 Oak St, Medina, OH 44256, 216-725-4492
May 19-21	Rochester, NY	Atlantic Division/New York State Convention / Harold Smith K2HC, 300 White Spruce Blvd, Rochester, NY 14623, 716-424-7184
May 19-21	Hot Springs, SD	Dakota Division Convention / Lon Seaboldt WS0V, RR1 Box 100-A-2, Hot Springs, SD 57747, 605-745-5929
May 20	Paducah, KY	Paducah ARA / David Fraser KQ4IU, 5715 Blandville Rd, Paducah, KY 42001, 502-554-7999
May 20	Belvidere, NJ	Cherryville Hamfest / Marty Grodzinski NS2K, 6 Kirkbridge Rd, Flemington, NJ 08822, 908-806-6944, Warren County Fairgrounds, off Route I-78. Talk-in 147.375+600, Adm \$6
May 20	Festus, MO	Jefferson County ARC / Herb Metts N0NTJ, PO Box 232, House Springs, MO 63051, 314-671-0667
May 20	Kansas City, MO	Missouri State Convention / Chuck Miller WA0KU, 7000 NE 120 St, Kansas City, MO 64166, 816-781-7313
May 20-21	Birmingham, AL	Alabama Section Convention / Bill Levey WA4FAT, 2953 Donita Dr, Birmingham, AL 35243, 205-967-6122
May 20-21	Ruidoso, NM	Sierra Blanca ARC / Gunnar Carlson AE4W, PO Box 4067, Ruidoso, NM 88345, 505-525-2159
May 20-21	Yakima, WA	Yakima ARC / Mark Tharp KB7HDX, PO Box 2222, Yakima, WA 98907, 509-965-3379
May 21	Peotone, IL	Kankakee ARS, Hamfest '95 / Willis Bowser K91FO, 1210 N. Riverside Dr, Mokena, IL 60954-3452, 815-472-2079, Will County Fairgrounds, I-57 Exit 327 (East), Talk-in 146.94, Adm. \$5
May 21	Wabash, IN	Wabash County ARC / Larry Manning N9AFI, 5199 E State Rd #218, LaFontaine, IN 46940, 317-981-4735
May 21	Burlington, IA	Valley Emergency Communications Assn / Chuck Gysi N2DUP, PO Box 911, Burlington, IA 52601-0911, 319-752-3000
May 21	Cambridge, MA	MIT RS & MIT Electronics Research/Steve Fineberg W1GSL, PO Box 397082 MIT Branch, Cambridge, MA 02139-7082. Flea Market 9am-2pm. Albany & Main St. Adm. \$2. Talk-in 146.52, 449.725/444.725 - pl 2A.
May 21	Woodbury, NY	Long Island Mobile ARC / Neil Hantman WE2V, 2 Majestic Ct, Dix Hills, NY 11746, 516-462-5549
May 26-28	Tulsa, OK	Oklahoma State Convention / Merle Griffin WB5OSM, 11671 E 80th St N #BB, Owasso, OK 74055, 918-272-3081
May 28	Chicago, IL	Chicago Amateur Radio Club / CARC, 5631 W Irvingpark Rd, Chicago, IL 60634, 312-545-3622, DeVry Inst. of Tech., Talk-in 147.255+, 444.825+, 8am-3pm, Adm \$5

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## Is the FCC abandoning us?

"Horse and buggy regulators" is the way FCC (Federal Communications Commission) Chairman Reed E. Hundt referred to the Compliance and Information Bureau (CIB), the Commission's department responsible for handling complaints and monitoring the spectrum for compliance. The CIB is the FCC division most important to radio hobbyists as it includes the FCC's field offices and monitoring stations, and is responsible for handling interference complaints.

Following a consideration by Congress to shut down the entire FCC, the consultant firm of Booz-Allen & Hamilton, Inc. was retained to assist the CIB in self-assessment. We contacted Joe Casey, Deputy Bureau Chief of the CIB, to get more information. Casey pointed out that the following proposals still await Commission approval.

Several FCC field offices will be closed or consolidated. Miami's closing will be absorbed by Tampa, Buffalo by New York City, and St. Paul by Chicago (with a resident agent telecommuting).

All monitoring stations will be closed. These comprise Vero Beach, FL; Powder Springs, GA; Grand Isle, NE; Belfast, ME; Allegan, MI; Kingsville, TX; Douglas, AZ; Ferndale, CA; San Juan, PR; Anchorage, AK; and Honolulu, HI. Midwatch (10:00 pm-6:00 am) personnel have already been eliminated.

New-generation, high-frequency (HF), radio-direction-finding (RDF) interferometers will be installed and remotely controlled from the one remaining station in Laurel, MD. Once the equipment is in place and working, former personnel will be offered the opportunity to move to remaining field offices.

The radical changes could be in motion as early as October 1995, in time for the new fiscal year.

Six regional offices will be eventually reduced to three: Boston will be absorbed by Chicago for a northeast region; Atlanta by Kansas City for a

south-central region; Seattle and San Francisco will remain open for the time being.

Some affected personnel who are losing their jobs may accept transfers, others may take early retirement; the first hundred eligible employees who applied by the end of March could participate in a buyout, up to \$25,000 for those with vestments of 20 years or more.

If money is an issue, shouldn't the multi-billion-dollar spectrum auctions have yielded some revenue for the Commission? No; except for auction administration costs, that windfall goes to the U.S. Treasury for other purposes like deficit reduction.

So who will handle complaints? Even now most consumer complaints of CB, amateur radio, and other nuisance sources are largely ignored by the Commission who hopes for self-policing within the industry. Additionally, the FCC is considering the creation of a toll-free, 800 call center in Chicago, computer coordinated; if that works, they intend to go nationwide.

Some complaints may be referred to special private industry specialists for resolution. One proposal was to turn complaints against broadcasters over to the National Association of Broadcasters; that would be about as effective as appointing the NRA to enforce the Brady Bill.

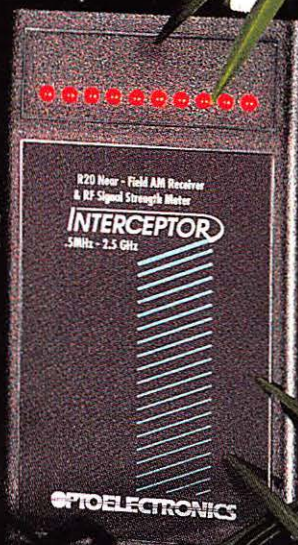
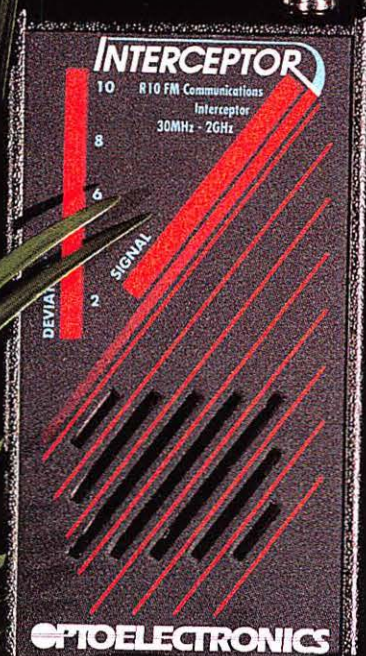
Self-policing doesn't work; deregulation of the Citizens Radio Service certainly hasn't curbed freebanding or excessive power, nor has policing of the ham bands by the Amateur Radio Service stopped jamming and obscenity.

Effective enforcement must come from outside, from qualified authorities empowered by lawmakers to make objective, unbiased decisions. Perhaps the U.S. Attorney's office, assisted by U.S. Marshals, could process validated complaints.

If the FCC can't—or won't—do it, then the responsibility must be placed on another responsible entity, whether from within the government or from the private sector.



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- Completely automatic with no tuning required.
- 400 foot pick up range from hand held radios. (Distance will vary with RF background.)
- Use built in speaker or earphone/headphones.

### Model R20 Interceptor/Bug Detector AM Communications Interceptor®

The R20 is a compact RF signal strength detector with a 10 segment bargraph display. There is also an audio output from the detector that is processed for constant volume for use with ear phone.

The audio output is useful for room sweeps where in close proximity to a transmitter a quieting effect can be heard due to detector saturation.

Transmitters can be easily checked for output and AM modulation.

- The 10 segment LED bargraph responds to all RF signals with nominal 3dB increments
- Pocket sized with built in telescoping antenna.
- 9 Volt battery operation.
- Monitor Aircraft, CB, AM broadcast transmissions when close.
- Check Microwave oven leakage.
- Wide .5MHz - 3GHz+ frequency range.

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▶ 100 kHz

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